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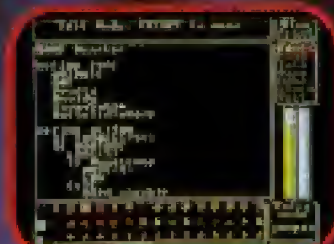
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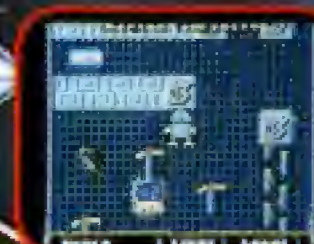
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FILE LINK
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TRAKKER
Chased by a Jagga

REPTON INFINITY – Featuring a Sophisticated Game Creator

The Repton series of games is the most successful set of software ever published for the BBC Micro and Electron computers; more than 120,000 Repton cassettes and discs have now been sold. Repton has been fully described as 'the thinking man's arcade game'... since it requires the use of clever strategy as well as pure arcade skill.

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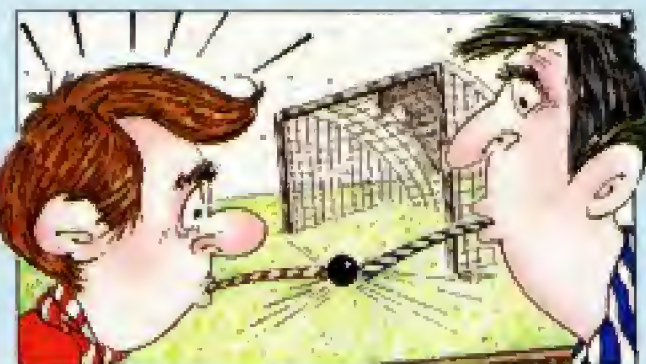
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Take a deep breath and enter this listing for an exciting computerised version of the classic table top game.

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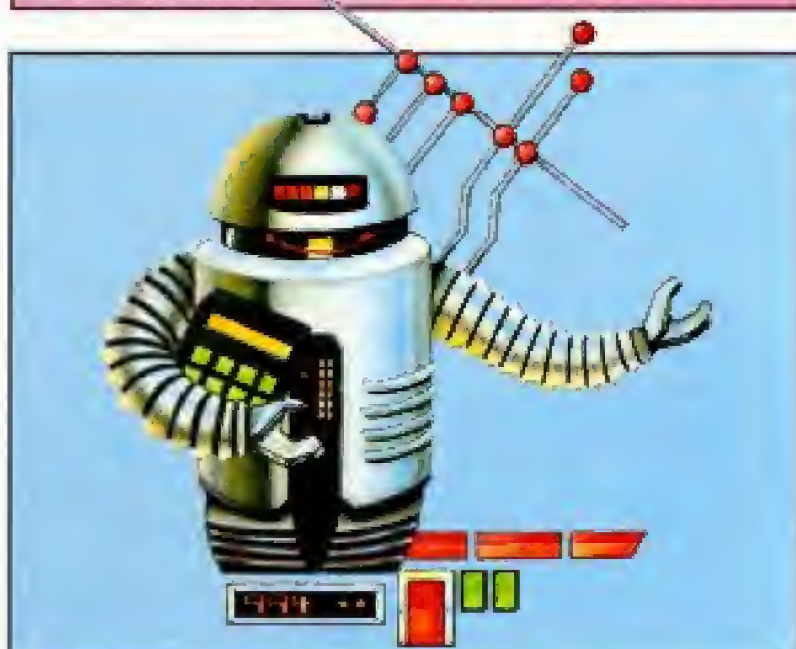
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electron user NEWS

ACP is back in business

ONE of the most famous names in the Electron world – ACP – is being revived after a 12 month hiatus. It means that the firm's acclaimed products will soon be available again.

The company quickly made a name for itself in the Electron market after bringing out its first titles three years ago.

It acquired a loyal following with products such as Advanced Disc Toolkit, Advanced Disc Investigator, Electron DFS and Advanced Control Panel.

All these main software items in the firm's catalogue are to be made available again.

"For the past year Pres has been supporting ACP products", said spokesman John Huddleston. "A new agreement means we can now start to re-market and sell them under the ACP brand name once again.

"It will make us the only supplier of both of Acorn's own filing systems on the Electron.

"And further good news for Electron users is that all the ACP titles are being re-issued at their old prices".

Accent on quality games

IN a market increasingly dominated by budget titles, Tynesoft (091-414 4611) is staying loyal to quality in the Electron games sector.

The firm's latest title is *Circus Games*, a multi format game featuring four traditional Big Top activities.

These are trapeze, tightrope walking, tiger taming and bareback horse riding.

The program is integrated with other characters from circus life, including clowns which have been modelled

on real performers with the Ringling Bros/Barnum and Bailey organisation.

Another Tynesoft release due out before Christmas is *Superman – Man of Steel*.

"This is a totally different game from that produced by First Star three years ago", said Tynesoft's Colin Courtney.

"Since we acquired the licence for Superman several months ago we have put together a totally new version of the comic strip hero's adventures".

The multi load, multi event game is presented like 14 pages of a real comic book. Players can delve into nine of these pages and help Superman on his missions.

Both new games will cost £9.95 each.

"I believe these releases demonstrate that we are doing our best to prevent the Electron market being completely swamped by budget titles", said Colin Courtney. "We feel there is a still a call for quality Electron games".

Ship's dog scuttles Electron

IN 1985, faced with redundancy from a boatbuilding and marine hire company, Roger Sharp made the decision to go it alone – with a little help from his Electron.

That led to him designing and building his own boat from scratch, with the intention of running cruises on the North West's canals.

Roger, who lives in Whaley Bridge near Stockport, has been awarded the accolade of North West Entrepreneur of



Roger Sharp and the Electron – dunking ship's dog, Ben

the Year.

"We needed a computer for all sorts of things, from keeping client records organised to timetabling bookings and printing mail-

shot labels", he says. "And the Electron was just the machine for the job".

Roger, now trading as Unicon Marine, recently launched his new boat, the Judith Mary II.

Unfortunately his trusty Electron is no longer around to lend a hand – thanks to Ben, the ship's dog.

"I'd been working with the Electron on deck and was called away for a few minutes", says Roger. "By the time I got back, Ben had managed to bury it. And it's never been quite the same since we got it out of the canal".

Budget games for Xmas market

THE first four budget releases under the new Blue Ribbon/Superior Software licensing deal are due out about the same time this issue of *Electron User* reaches the shelves.

They are the best-sellers Repton and Karate Combat,

priced £2.99 each, and Percy Penguin and Mr Wiz, priced £1.99 each.

Blue Ribbon (0302 340480) has negotiated the rights to re-issue 15 Superior hits.

The 11 remaining games will be made available in

groups of three or four at intervals of about three months.

"We expect these first four releases to give us a clean sweep of the Electron charts at Christmas", said Blue Ribbon sales director Martyn Wilson.

Gallup Software Chart



THIS MONTH	LAST MONTH	TITLE (Software House)	COMMENTS	PRICE
1	△ 2	FRANKENSTEIN 2000 <i>Altantis</i>	This budget title now heads the charts. If you enjoy things that go bump in the night try this one out.	1.99
2	▽ 1	SOCCER BOSS <i>Alternative</i>	Down to second place again. This is not a new game, but it is very good value, the higher of the two manager titles.	1.99
3	●	OLYMPIC SPECTACULAR <i>Alternative</i>	Originally on sale as Micro Olympics, you can now participate in the games for a fraction of the fare to Seoul.	1.99
4	△ 5	COMBAT LYNX <i>Alternative</i>	This wartime helicopter simulation sets a mission for the more adventurous. A good introduction to the world of flight simulators.	1.99
5	△ 10	DEAD OR ALIVE <i>Alternative</i>	As the Sheriff of Dodge City you must watch the bank, the jail and especially your thirst in this very hot town.	1.99
6	●	GEOFF CAPES STRONGMAN <i>Mastertronic</i>	The television programme has bitten the dust, but the game refuses to die. Your strength depends on the dexterity of your fingers.	1.99
7	▽ 3	REPTON THROUGH TIME <i>Superior</i>	A must for ardent Repton fans. As you would expect, there are plenty of puzzles from the prehistoric to the modern.	9.95
8	▽ 4	BARBARIAN <i>Superior</i>	Are you a fighter at heart? If so you'll enjoy this hack and slay game. Not one to test the brain cells, but you must stay alert.	1.99
9	▽ 8	ROUND ONES <i>Alternative</i>	Breakout strikes again, with you controlling the B.A.L.L. - a Block Assault Laser Launch. The usual mystery blocks abound.	1.99
10	△ 14	CREEPY CAVE <i>Atlantis</i>	A strange place to lose your keys, but stranger things have happened. Fun, colourful and enjoyable romp chasing a mischievous ghost.	1.99
11	▽ 6	GOLF <i>Blue Ribbon</i>	Not one to help golf enthusiasts improve their swing, but it is still reasonably absorbing and requires a certain amount of skill.	2.99
12	●	FOOTBALL MANAGER <i>Addictive</i>	Back again with the football season proper. This will probably be around as long as the managers keep changing their jobs.	9.95
13	●	FIVE STAR GAMES <i>Beau Jolly</i>	Never a month goes by without compilations being present among the best sellers, representing value and good ideas for presents.	1.99
14	▽ 7	DARTS <i>Blue Ribbon</i>	Three different games to choose from: 501 and Cricket are the most worthwhile. Simple graphics and little sound.	1.99
15	▽ 12	CAVERN CAPERS <i>Alternative</i>	The scenario is not new but there are no complaints about the price. Everything is here which you would expect in a Scramble game.	1.99
16	●	ROCKFALL <i>Alternative</i>	The name tells all - can you escape and do you want to, knowing what is out there? Making its reappearance in the charts.	1.99
17	●	ELITE <i>Superior</i>	If you have never played this and do not know what it is, go and buy it immediately, you won't be disappointed.	12.95
18	●	WAY OF THE EXPLODING FIST <i>Mastertronic</i>	A typical martial arts game with simple graphics and sound. Fight your way to success, the oriental way and all at a budget price.	1.99
19	▽ 18	TRIPLE DECKER 3 <i>Alternative</i>	Only one of the 10 compilations under this name. This one holds Lunar Invasion, Lunar Lander and Jam Butty.	1.99
20	▽ 16	BONECRUNCHER <i>Superior</i>	Skeletons make excellent soap, and sea monsters love bathing, so what is more natural then you to go hunting the ingredients.	9.95

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Roland Waddilove shows how to access the rom's osfile routines in Part 2 of his series on the DFS

IN the first part of this short series delving into the complexities of accessing the Electron's disc filing system – Plus 3 ADFS or Plus 4 DFS – we examined how files are stored and how they are deleted. The result was a utility which totally destroyed any file on disc so that it could never be recovered.

This month I'm going to cover just one operating system call named osfile. Although it is only one call, it is very flexible and several different operations can be performed just by altering the parameters we pass to it.

We'll start with a relatively simple example which alters the access code of a file, which is the file's locked/unlocked status. When a file is locked it can't be overwritten, deleted, destroyed or wiped off the disc, so is as safe as can possibly be made from accidental loss.

You can tell if a file is locked by cataloguing the disc and looking at the filename – if it is followed by an L it is locked.

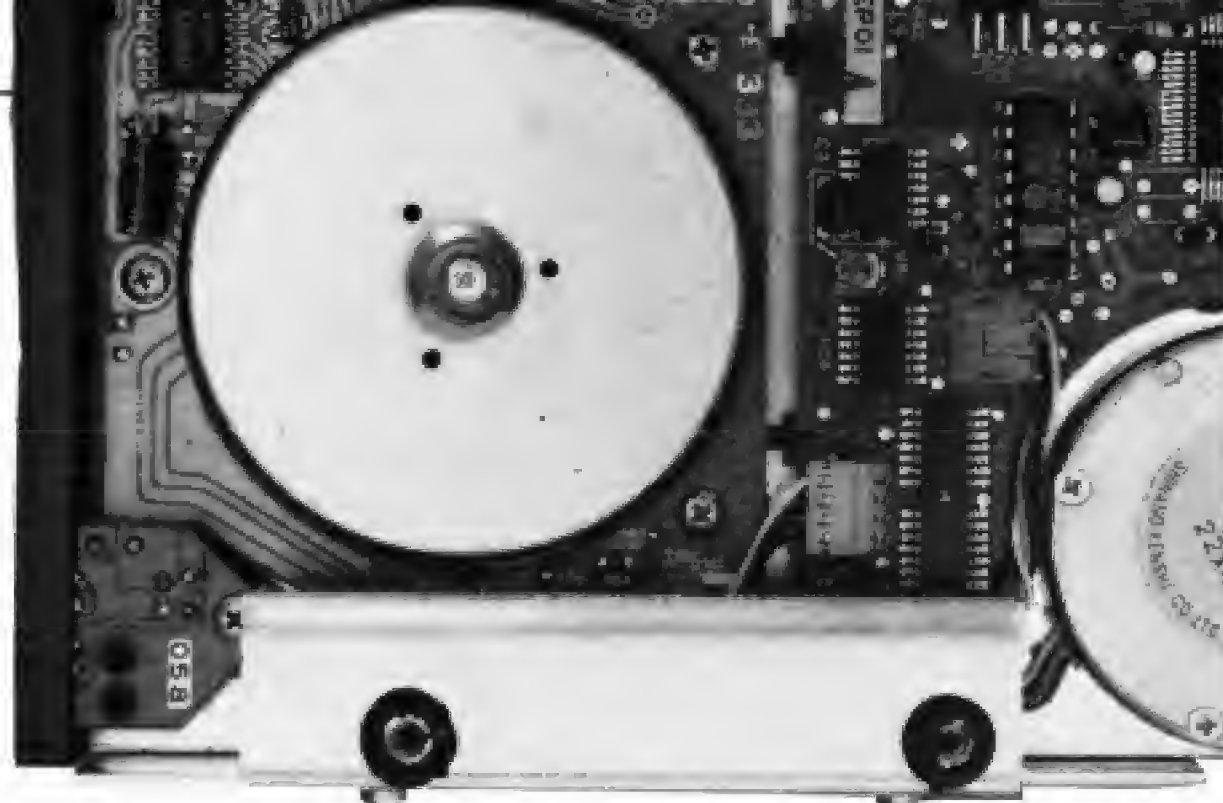
Program I shows how a file can be locked using an osfile call from machine code. The A register is loaded with the number four to tell osfile that we want to alter the access code of a file, and the X and Y registers point to an 18-byte parameter block located somewhere in memory. This is the format of all osfile calls, so once you've learnt this, the rest become relatively easy.

The layout of the parameter block is shown in Table I, and different parts are used for different operations.

All we need to do for osfile four is to store the address of the file we want to lock in the first two bytes, and &0A in the file attributes byte 14. You can see this as a series of EQUWs and EQUWs in

```
10 REM PROGRAM I
20 REM Lock file
30 osfile=&FF00
40 FOR pass=0 TO 2 STEP 2
50 P1=&8000
60 [ OPT pass
70
80 .lock
90 LDA #4 !Write attributes
100 LDX #block MOD 256
110 LDY #block DIV 256
120 JSR osfile
130 RTS
140
150 !osfile parameter block
160 .block
170 EQUW fname
180 EQUW 0 !Not used
190 EQUW 0 !Not used
200 EQUW 0 !Not used
210 EQUW &0A !Lock file
220
230 !Filename
240 .fname
250 EQU$ STRING$(11,CHR$0)
260
270 ]
280 NEXT
290
300 INPUT 'Filename:'a$
310 $fname=a$
320 CALL lock
```

Program I



Disc operator

the listing starting at line 170.

Run the program, enter the name of the file you want to lock, and the machine code is called to lock it. Alter the file attributes byte from &0A to &00 and run the program again. You'll now find that it has been unlocked.

Byte	Use
0	Address of filename
2	Load address
6	Execution address
10	Start address/length of file
14	End address/file attributes

Table I: The osfile parameter block

Now for a slightly different operation – reading a file's catalogue information. This time it is osfile five and the call is exactly the same as before, but with a slightly different parameter block. The only change is that the file attribute status is no longer required, just the filename.

Enter and run Program II to read a file's catalogue. The load address is placed at byte two, the execution address at byte six, the length at byte 10 and the lock status at byte 14. This infor-

mation is displayed by three print statements at the end of the listing.

Next we'll write a file's catalogue information using osfile one in Program III. As before, the only changes are to the parameter block. The address of the filename is stored at byte zero, the new load address at byte two, and the new execution address at byte six. The other bytes aren't used. Run Program III and enter the name of the file to alter. Now use *INFO to check that it has actually changed the catalogue information.

Program IV uses osfile zero to save a section of memory. The calling procedure is the same, but the parameter block is again different. Byte zero stores the address of the filename, byte two is the load address, byte six the execution address, byte 10 the address of the first byte to save and byte 14 is that of the last byte to save plus one.

Run Program IV and it will save a copy of itself to disc with the filename Myself – that's because I've set the first byte to save as PAGE and the last byte as TOP+1 in the parameter block at line 160.

Program V loads this file to &4000 using osfile &FF. The parameter block this time holds the address of the filename at byte zero as before, and a load address flag at byte six. If this flag is

```
10 REM PROGRAM II
20 REM Read file's catalogue
30 osfile=&FF00
40 FOR pass=0 TO 2 STEP 2
50 P1=&8000
60 [ OPT pass
70
80 .read.cat
90 LDA #5 !Read catalogue
100 LDX #block MOD 256
110 LDY #block DIV 256
120 JSR osfile
130 RTS
140
150 !osfile parameter block
160 .block
170 EQUW fname
180 EQUW 0 !Doesn't matter
190 EQUW 0 !Doesn't matter
200 EQUW 0 !Doesn't matter
210 EQUW 0 !Doesn't matter
220
230 !Filename
240 .fname
250 EQU$ STRING$(11,CHR$0)
260
270 ]
280 NEXT
290
300 INPUT 'Filename:'a$
310 $fname=a$
320 CALL read.cat
330 PRINT 'Load address=';block!2
340 PRINT 'Execution address=';block!6
350 IF block!14=0 PRINT 'File unlock
ed' ELSE PRINT 'File locked'
```

Program II


```

10 REM PROGRAM III
20 REM Write file's catalogue
30 osfile=&FFD0
40 FOR pass=0 TO 2 STEP 2
50 PX=&8000
60 [ OPT pass
70
80 .write_cat
90 LDA #1 \Write catalogue
100 LDX #block MOD 256
110 LDY #block DIV 256
120 JSR osfile
130 RTS
140
150 \osfile parameter block
160 .block
170 EQUW fname
180 EQUW 0 \Put load address here
190 EQUW 0 \Put exec address here
200 EQUW 0 \doesn't matter
210 EQUW 0 \doesn't matter
220
230 \filename
240 .fname
250 EQUW STRING$(11,CHR$0)
260
270 ]
280 NEXT
290
300 INPUT "Filename:"a$
310 $fname=a$
320 INPUT "New load address:"a$
330 block!2=EVAL("&a$")
340 INPUT "New execution address:"a$
350 block!6=EVAL("&a$")
360 CALL write_cat

```

Program III

non-zero the file will be loaded at the address stored in its catalogue on disc, however, if zero the address stored at byte two will be used, overriding the catalogue information, and this is what Program V does.

You can check that this program works by running it, setting PAGE to &4000 and typing OLD followed by LIST. The copy of Program IV should be displayed on screen.

Finally, we'll delete the program Myself with a call to osfile six. This is a relatively simple procedure and all that is required is the address

```

10 REM PROGRAM IV
20 REM Save file
30 osfile=&FFD0
40 FOR pass=0 TO 2 STEP 2
50 PX=&8000
60 [ OPT pass
70
80 .save
90 LDA #0 \Save memory
100 LDX #block MOD 256
110 LDY #block DIV 256
120 JSR osfile
130 RTS
140
150 \osfile parameter block
160 .block
170 EQUW fname
180 EQUW PAGE \Load address
190 EQUW &8023 \Execution address
200 EQUW PAGE \First byte
210 EQUW TOP+1 \Last byte+1
220
230 \filename
240 .fname
250 EQUW "Myself":EQUW &800
260
270 ]
280 NEXT
290
300 CALL save

```

Program IV

```

10 REM PROGRAM V
20 REM Load file
30 osfile=&FFD0
40 FOR pass=0 TO 2 STEP 2
50 PX=&8000
60 [ OPT pass
70
80 .load
90 LDA #&FFF \load file
100 LDX #block MOD 256
110 LDY #block DIV 256
120 JSR osfile
130 RTS
140
150 \osfile parameter block
160 .block
170 EQUW fname
180 EQUW &4000 \Load address
190 EQUW 0 \Use this load address
200 EQUW 0 \not used
210 EQUW 0 \not used
220
230 \filename
240 .fname
250 EQUW "Myself":EQUW &800
260
270 ]
280 NEXT
290
300 CALL load

```

Program V

of the filename in byte zero. Program VI shows how this is done.

What I haven't showed you is osfile two and three, I'll leave these for you to experiment with. Osfile two changes just the load address in the file's catalogue, whereas osfile three changes the execution address. With the former only the new load address and filename are required, and the

```

10 REM PROGRAM VI
20 REM Delete file
30 osfile=&FFD0
40 FOR pass=0 TO 2 STEP 2
50 PX=&8000
60 [ OPT pass
70
80 .delete
90 LDA #6 \delete file
100 LDX #block MOD 256
110 LDY #block DIV 256
120 JSR osfile
130 RTS
140
150 \osfile parameter block
160 .block
170 EQUW fname
180 EQUW 0 \Not used
190 EQUW 0 \Not used
200 EQUW 0 \Not used
210 EQUW 0 \Not used
220
230 \filename
240 .fname
250 EQUW "Myself":EQUW &800
260
270 ]
280 NEXT
290
300 CALL delete

```

Program VI

latter requires just the new execution address and filename. The osfile call is the same as all the others we have looked at.

● That rounds up this look at osfile operations. However, we're far from finished with the disc system, and next month I'll be showing many more powerful routines for DFS and ADFS owners.

Save a section of memory

A	0
XY	Address of parameter block
block 0-1	Address of filename
block 2-5	Load address
block 6-9	Execution address
block 10-13	Address of first byte
block 14-17	Address of last byte+1

Change a file's catalogue information

A	1
XY	Address of parameter block
block 0-1	Address of filename
block 2-5	Load address
block 6-9	Execution address
block 10-13	Not used
block 14-17	Not used

Change a file's load address

A	2
XY	Address of parameter block
block 0-1	Address of filename
block 2-5	Load address
block 6-9	Not used
block 10-13	Not used
block 14-17	Not used

Change a file's execution address

A	3
XY	Address of parameter block
block 0-1	Address of filename
block 2-5	Not used
block 6-9	Execution address
block 10-13	Not used
block 14-17	Not used

Change lock/unlock status

A	4
XY	Address of parameter block
block 0-1	Address of filename
block 2-5	Not used
block 6-9	Not used
block 10-13	0 is locked/10 is unlocked
block 14-17	Not used

Read a file's catalogue information

A	5
XY	Address of parameter block
block 0-1	Address of filename
block 2-5	Not used
block 6-9	Not used
block 10-13	Not used
block 14-17	Not used

Delete a file

A	6
XY	Address of parameter block
block 0-1	Address of filename
block 2-5	Not used
block 6-9	Not used
block 10-13	Not used
block 14-17	Not used

Load a file

A	255
XY	Address of parameter block
block 0-1	Address of filename
block 2-5	Load address
block 6-9	1 means use file's load address, 0 means use parameter block's
block 10-13	Not used
block 14-17	Not used

The Electron's os file routines

Tape trouble taped

WAITING for a program to load from tape is always a bind, but there is nothing more frustrating than a message appearing on the screen telling you to rewind the tape yet again. If everything is working perfectly, programs will load without a hitch every time, and this article will help you attain this ideal by keeping your cassette recorder in good order.

First of all, let's consider which make of tape recorder is best for your computer. Should you buy one made specially for the purpose? Are some unsuitable? The answer is that any medium priced, mono, portable recorder with motor control socket and with preferably a tape position indicator, will serve admirably.

There is no advantage in paying more for a sophisticated model with tone control, in fact tailoring the higher frequencies could be a disadvantage. If you have a tone control you will find that the best setting is no bass with treble turned up – a setting not recommended for your music tapes!

Stereo recorders are not as useful, but the output from one channel can be used. The output from one channel will be found to be better than

Ernest Howorth shows how to get the best from your tape recorder

the other with individual tapes, and some experimenting will be necessary.

The procedure when you lose a program during loading is to first of all wind back the tape to a point before the *Rewind* tape notice appeared using the block numbers to guide you, then press Play. Now you find that loading will recommence and all is well. The cause of the break could be a pulse from the mains, perhaps someone switching on a motor connected to the same supply.

If you have persistent trouble, particularly when loading from commercial tapes, it could be that the azimuth alignment of the play/record head is not right. It can alter with use, or it may not have been set correctly by the manufacturer.

It is a simple job to put it right provided you can use a soldering iron and a screwdriver. If you do

not feel competent a radio repairer will do it for you, but if you are up to the task, read on.

The signals recorded on the program tape are in the higher frequency bands and for good high frequency response the gap in the tape head must be precisely at a right angle to the tape path. It will be found that tapes recorded on a machine which is out of adjustment may load perfectly satisfactorily using that particular machine, but will be incompatible with others.

Adjustment is carried out while the tape is playing by tuning a screw which tilts the head, and the setting is correct when the strongest signal is obtained. Accuracy is essential, and you need a suitable level meter to measure the signal – the one illustrated in Figure 1 is basically a 0-1 milliammeter. Though very simple, it gives good results, and with it the azimuth setting can be set very accurately.



Figure 1: Adjusting the azimuth setting using a small screwdriver and milliammeter

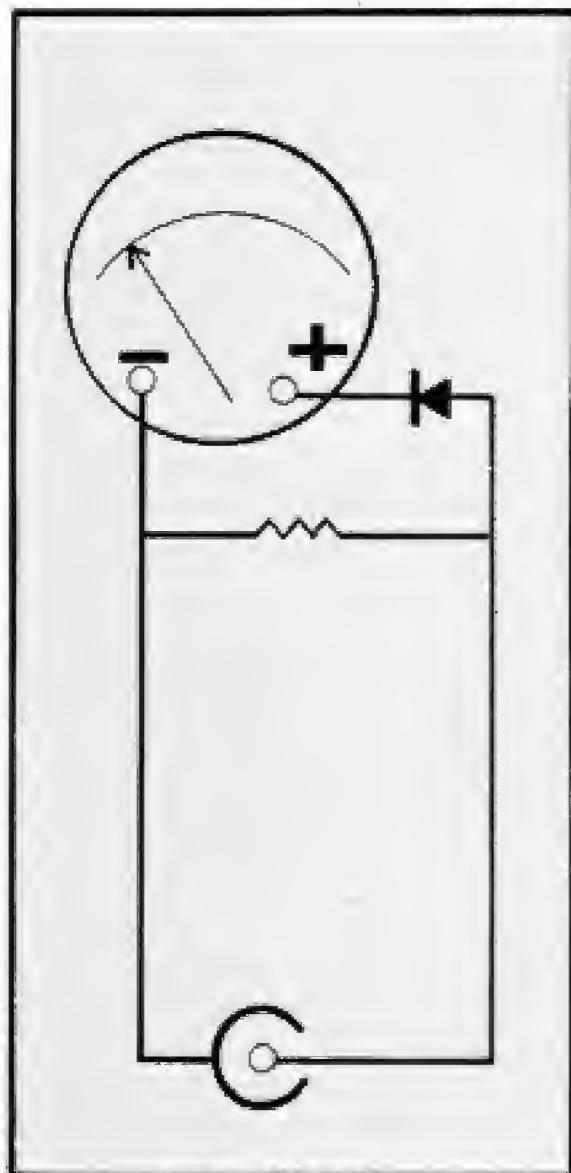


Figure 2: Circuit diagram of the azimuth tester

Wire it up as shown in Figures II and III making sure that the diode is the right way round – a white band or the pointed end of the diode connects to the positive terminal of the meter. If connected the wrong way round you won't get a reading. A more sensitive meter can be used, but the value of the resistor may have to be adjusted to suit. Experiment with different values.

Plug the level meter into the earphone socket on the tape recorder and take out all the computer plugs. Ideally you would use a test tape with a pure tone, but they are a bit pricey and I use the Electron Introductory Cassette which has been recorded on a correctly aligned machine – this is of course, essential.

Turn the volume to zero and play the tape. Slowly advance the volume until the pulsating signal peaks at mid scale on the level meter. Now for the tricky bit. Gently locate a screwdriver in the head of the adjusting screw and very carefully turn anti-clockwise until the peak levels fall appreciably, it should not require more than half a turn. Then turn clockwise until the levels fall by about the same amount.

The precise setting will be found midway between these two points, rotate to and fro until you are certain you have obtained the highest possible reading. Then lock the head of the screw with a small spot of quick-drying paint or nail varnish.

The adjusting screw is readily accessible and the usual position of the access hole is directly above the screw head in the Play position. Models vary, but most play/record heads are mounted so that the azimuth angle can be varied by compressing or relaxing a mounting spring on one side by means of a screw. Turning it too far in either direction could damage the head mounting.

It is unlikely that the azimuth angle will need resetting for a considerable time, but the meter will be found very useful for setting the volume control on the cassette player. Simply note the reading when the tape is loading correctly and then you can always return to that same setting.

This is very useful, because not all tapes are recorded at the same level and may require the volume control to be adjusted. If desired, the meter can be permanently connected in parallel with the ear output plug from the recorder; it will not interfere with the loading function in any way.

Time spent keeping the recorder in good trim will be well repaid. It needs regular dusting and cleaning, paying particular attention to the pinch roller which, on well used recorders, is the main cause of troublesome tape slip.

If glazed areas on the rubber face of the roller cannot be removed with head-cleaning fluid, a drastic, though necessary, remedy is to use fine abrasive paper lightly applied to the rolling surface. Great care must be taken not to scratch the metal capstan pin or the head and guides. Clean thoroughly afterwards and make sure that all parts are dry before running a tape. The slightest mount of cleaning fluid on the recorded face of a tape will spell disaster.

If the rubber roller will take a finger nail impression its useful life is over, so fit a new one –

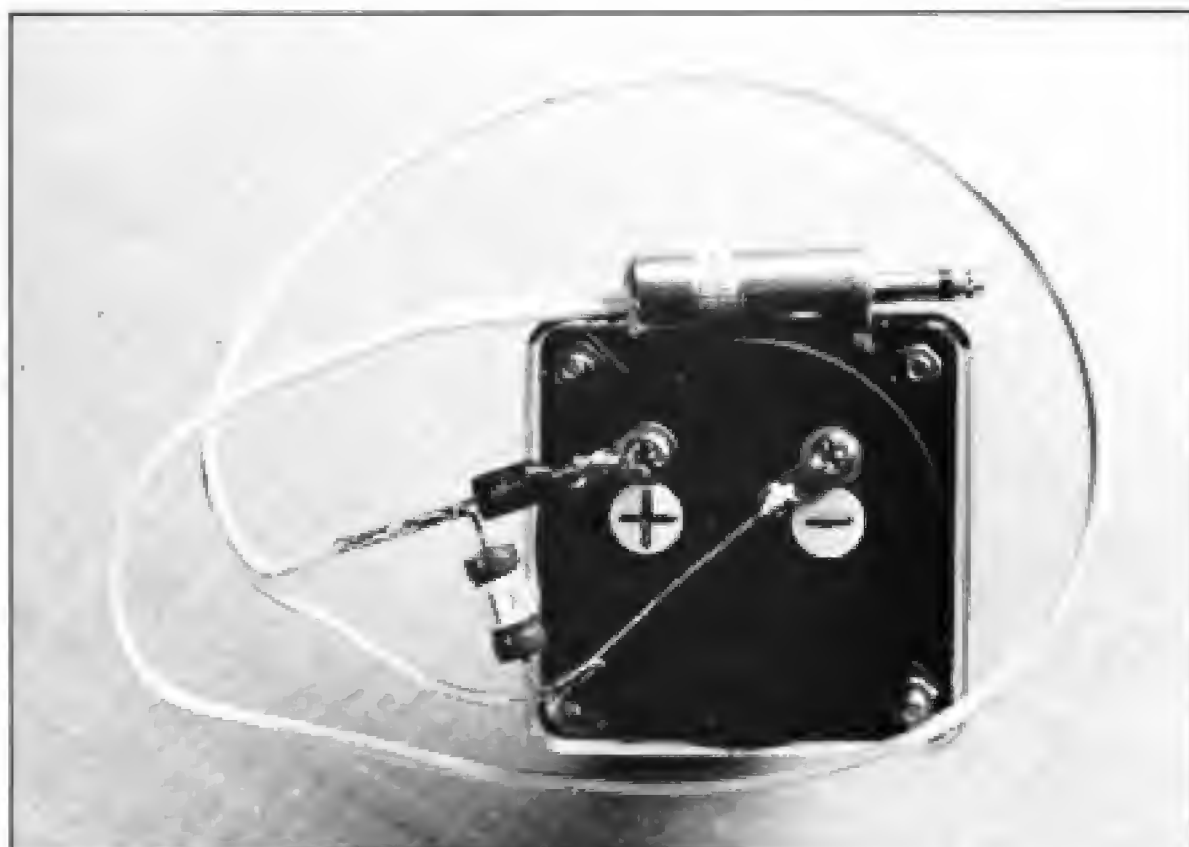


Figure III: The back of the milliammeter

they're not expensive. One way to treat the pinch roller is when the tape is not running. Do get into the habit of pressing Stop when the program has loaded, as prolonged pressure will distort the rubber which will take an impression of the capstan.

The record/play head should be rounded and shiny, and if worn will show a flattened surface where contact is made with the tape. If you possess a fine soldering iron and a certain amount of skill you can replace the head if careful note is taken of the four wire connections which will

have to be remade. In most cases the recorder will have to be removed from the plastic container, but generally this is not a problem.

One final tip, a little obvious but it may save someone's valuable tape – and I speak with experience – keep tapes well away from the speaker end of your recorder. The speaker fret on the type of recorder illustrated makes a very handy ledge for the spare cassette when changing – but there's a powerful magnet underneath capable of damaging the recording on your tape.



Figure IV: A close up view of the azimuth adjusting screw next to the record/play head

EVER dreamed of winning a cool million on the pools? Well, now your chances of making your bank manager grin happily have vastly improved, thanks to this powerful utility designed to predict the draws.

The program's ability to win is as yet untested, but with such a fantastic prize within reach no doubt there will be plenty of eager volunteers willing to try it out. You can bet I will.

First enter and save the program. When it is run you'll be asked if you want to load a previously saved data file - press N as you haven't created one yet. Next you'll be prompted to enter the details for match number one - the match number is printed in the bottom left hand corner of the screen.

Type in the home team - the first team on the pools coupon - league position, number of home games won and home games lost. You'll find this information on the sport pages of most newspapers. Now do the same for the away team - the second team on the coupon.

When this has been completed the program uses this information to predict the likelihood of

Hit the jackpot!

Roland Waddilove shows how to improve your chances of scooping the pools

the match resulting in a draw. Don't enter anything on the pools coupon at this stage as the data is stored in memory, but continue and enter the details for all the remaining teams. When the program has all the matches in memory press N when it asks you if there is another one, and the match results will be sorted into order of probability of a draw occurring.

The top 15 matches, along with their rating and coupon number, will be displayed on the screen

and all that remains is for you to put your crosses on the coupon. If you are going for the treble chance or full perm, 8 from 11 say, then put crosses against the first 11 matches.

Entering all the information that the program requires will take an hour or more, and there is always the possibility of typing slips creeping in. To combat this a Save Data feature has been included, which also doubles as a rather crude form of editing.

```
10REM Pools Predictor V1
20REM By R.A.Waddilove
30REM (c) Electron User
40ON ERROR GOTO 1340
50MODE 4:FX16
60PROCinitialise
70REPEAT
80PROCtitle
90PROCwindow(1,26,3,2):PRINT;match%
100PROCinput
110PROCcalculate
120PROCresult
130UNTIL k$="N" OR k$="n"
140PROCoutput
150END
160
170DEF PROCinput
180PROCwindow(4,6,30,5)
190INPUT Home team:home$
200INPUT League position:hp
210INPUT Home wins:hw
220INPUT Home lost:hl
230PROCwindow(4,14,30,5)
240INPUT Away team:away$
250INPUT League position:ap
260INPUT Away wins:aw
270INPUT Away lost:al
```

```
280ENDPROC
290
300DEF PROCresult
310team$(match%)-LEFT$(home$,11)- v
+LEFT$(away$,11)
320M%match%=match%:R%match%=draw$
330PROCwindow(6,22,26,2)
340PRINT Chances of a draw = ;draw%
; %
350PROCwindow(9,26,20,2)
360PRINT "Another one (Y/N)?";
370REPEAT k$=GET$
380UNTIL INSTR("YyNn",k$)>0
390match%=match%+1
400ENDPROC
410
420DEF PROCcalculate
430win=hw+al
440lose=hl+aw
450total=(win+lose+1)
460win=100*win/total
470lose=100*lose/total
480draw%=100-ABS(win-lose)-ABS(hp-ap)
490IF draw%<0 draw%=0
500ENDPROC
510
520DEF PROCinitialise
```

```
530VDU 23,224,85,170,85,170,85,170,8
5,170
540DIM team$(65),M% 65,R% 65
550COLOUR 129:COLOUR 0
560match%=1:OPT1,1
570PROCtitle
580PROCwindow(2,10,35,5)
590PRINT "Load data file (Y/N)?";
600REPEAT k$=GET$
610UNTIL INSTR("YyNn",k$)>0
620IF k$="N" OR k$="n" ENDPROC
630EX=OPENIN DATAT
640INPUT=FX,match%
650FOR I%=1 TO 65
660INPUT=FX,team$(I%),M%?I%,R%?I%
670NEXT
680CLOSE=FX
690ENDPROC
700
710DEF PROCcls
720VDU 26
730FOR I%=1 TO 5
740PRINT STRING$(240,CHR$(224));
750NEXT
760MOVE 0,28:DRAW 0,1023
770DRAW 1270,1023:DRAW 1270,28
780DRAW 0,28
790ENDPROC
```

Football Pools Predictor

Home team:Burnley
League position:4
Home wins:5
Home lost:2

Away team:Exeter
League position:15
Away wins:4
Away lost:3

Chances of a draw = 75%

25

Another one (Y/N)?

Entering the match data

Football Pools Predictor

Match	Draw
23 Wigan A. v Port Vale	89%
21 Preston v Bury	82%
7 Ipswich v Man City	79%
3 Middlesbro v West Ham	78%
2 Derby v Norwich	76%
4 Barnsley v West Brom	74%
13 Shrewsbury v Hull	74%
17 Cardiff v Reading	70%
22 Sheffield U v Wolves	68%
18 Gillingham v Chesterfiel	66%
8 Leeds v Watford	65%
16 Bristol Cit v Fulham	61%
14 Walsall v Sunderland	57%
19 Mansfield v Bristol Rov	52%
11 Plymouth v Bradford C.	45%

Hit a key...

The draw forecast

If you press the Escape key a Save routine will be initiated and the data will be stored on disc or tape before aborting the program. This means you can split the data entry task into more manageable chunks. When the program is run again you can reload the data entered so far and continue where you left off.

The program continues from the match you were entering at the time you pressed Escape, so if you make a mistake, tap the Escape key to save the data, re-run the program to re-load the data and enter the correct match details. It's crude but effective, especially if you have a disc drive.

One point to watch out for is the dreaded Can't extend error message with the DFS filing system when saving the data. To make sure this doesn't happen it is always best to use a blank disc on which to save the data. This problem doesn't occur with the ADFS.

The only foreseeable problem with this utility – and every silver cloud has a black lining – is that if every Electron user decides to try their luck and the program does come up trumps then the payout will be quite small as the money will be

split between literally thousands of winners.

Well at least you'll be able to brag that you won the pools!

PROCEDURES

initialise	Dimension arrays, load data file
title	Print program title
window	Set up a shadowed window
input	Input the match data
calculate	Work out chances of a draw
result	Print match result
output	Display 15 most likely draws
cls	Clear the screen

VARIABLES

match%	Match number on the coupon
home\$	Home team's name
hp	Home team's league position
hw	Home games won
hl	Home games lost
away\$	Away team's name
ap	Away team's league position
aw	Away games won
al	Away games lost
draw%	Chances of a draw

```

800
810DEF PROCwindow(X1,Y1,W1,H1)
820VDU 28,X1+1,Y1+1+H1,X1+1+W1,Y1+1
830COLOUR 128:CLS
840VDU 28,X1,Y1+H1,X1+W1,Y1
850COLOUR 129:CLS
860VDU 28 X1+1,Y1+H1,X1+W1,Y1+1
870ENDPROC
880
890DEF PROCoutput
900PROCcls:PROCwindow(9,10,20,2)
910PRINT "Calculating...";
920FOR IX=match%+1 TO 2 STEP-1
930FOR JX=2 TO 1X
940IF RX?JX>?(RX+JX-1) TX=RX?JX:RX?J
X=? (RX+JX-1):? (RX+JX-1)=TX:TX=MX?JX:MX
?JX=? (MX+JX-1):? (MX+JX-1)=TX:TS=team$(
JX):team$(JX)=team$(JX-1):team$(JX-1)=
TS
950NEXT
960NEXT
970PROCtitle
980PROCwindow(1,6,36,18)
990PRINT TAB(10)"Match"TAB(30)"Draw"
1000JX=0
1010REPEAT JX=JX+1
1020PRINT;MX?JX;TAB(3)team$(JX);TAB(3
1);RX?JX;" "
1030UNTIL JX=15 OR JX=match%-1
1040PROCwindow(12,26,14,2)
1050PRINT "Hit a key...";
1060KS=GETS
1070ENDPROC
1080
1090DEF PROCtitle
1100PROCcls:PROCwindow(6,1,27,2)
1110PRINT "Football Pools Predictor";
1120ENDPROC
1130
1140REM Save data
1150IF ERR<>17 MODE 6:PRINT:REPORT:PR
INT " at line ";ERL:END
1160PROCtitle
1170PROCwindow(2,10,35,5)
1180PRINT "Saving data...";
1190FX=OPENOUT"DATA1"
1200PRINT#FX,match%
1210FOR IX=1 TO 65
1220PRINT#FX,team$(IX),MX?IX,RX?IX
1230NEXT
1240CLOSE#FX
1250MODE 6
1260PRINT:PRINT "Data saved...";

```



SOFTWARE • REVIEWS

LIKE its immediate predecessor, Sam 4 departs from the standard set by Sams 1 and 2 – that of re-releasing games from Superior's back catalogue. Two of the titles on offer were originally released by another software house and the third is a brand new game, never before available in any form.

This idea of including a previously unreleased game extends the compilation's appeal to a number of software buyers who may not otherwise consider the package if they already had some of the featured titles separately.

The term cartoon quality graphics has been much abused when applied to computer games, but any Electron arcade addict who was around in the heady days of 1986 will still remember the first game to which that over used phrase could justly be applied. At that time platform games were just starting to become a bit stale, and something a little different was needed. The first game on the compilation – **Frak!** – went the whole way and provided something very different indeed.

What made it so, apart from its amazing graphics, was the way that so many totally incompatible concepts, creatures and objects were combined with wild abandon to produce a game that bore no resemblance to the platform genre of the time, or indeed to anything else.

The star of **Frak!** is a delightful little caveman by the name of Trogg, one of the unlikeliest celebrities ever to grace the Electron. The aim of the game is simple: You, as Trogg, must jump and climb around the screen collecting the many keys dotted around. Sounds easy, but there are

many hazards to overcome.

The game features 72 levels, plus a built-in competition section, each about three screens wide. As you approach the edges of the screen the backdrop scrolls to the left or right so you can always see what is in front of you. This feature comes in very useful for spotting distant hazards.

As you make your way up the first ladder and on to the rock platform above, you set eyes on your first Scrubbly. These are large and furry, have long teeth and a permanent happy stupid smile. But don't be fooled – they are quite deadly.

The Scrubblys don't move, but sit awkwardly in your way – no problem for a heavily armed caveman. Unlike your Neanderthal predecessors, however, your secret weapon is not a wooden club or stone axe, but a yoyo. With a quick flick of the wrist you despatch the offending beastie and your path is now clear.

Clear, that is, of Scrubblys – you still have to contend with daggers that rain down from the sky and balloons that fly up from the bottom of the screen. Both have a nasty habit of appearing at inopportune moments, but fortunately your yoyo works just as well against them as it does against your ground adversaries.

Each level features a time limit, and unlike most games you don't lose a life if you run out of time – you suddenly find that night has fallen and your yoyo no longer works. At this point all the daggers and balloons seem to gang up on you, and if you fall foul of any of the monsters or flying objects, or simply miss your footing on a jump, you swiftly go to your maker with a cry of **Frak!**

When you have collected all the keys from the

first level you are promoted to the second, where the rock platforms, ladders and Scrubblys are replaced by logs, hanging ropes and small monkey-like creatures with the same fatal properties as the guardians of the first level. On the third level you make your way along a series of girders and up and down chains that hang from them. Your adversaries are now small squat creatures with bulbous noses.

After you have completed the first nine levels you are returned to level one to find that the screen has turned upside-down. Levels 10 to 18 are, in fact, levels one to nine upside-down. Levels 19 to 27 are further variations, levels 28-36 are levels 19-27 upside-down, and so on.

Level 73 is the first screen of **Championship Frak!**, a very fast, difficult and thoroughly dagger and balloon-ridden version of the normal game. The competition associated with it has long since closed, but see how far you get anyway.

The game also includes a screen designer so you can dream up and save your own screens. It allows almost unlimited scope for producing difficult screens and nasty problems, and I think it a pity no add-on screens were ever published.

The newcomer is an interesting variation on **Asteroids** and goes by the name of **Cosmic Camouflage**. It is a sequel to Acornsoft's classic game, **Meteors**. Certainly first impressions of the game – a small triangular ship surrounded by asteroids – might make you think that it was unchanged.

Cosmic Camouflage uses the same rotate, thrust and fire keys as **Meteors**, so any devotee of that game will feel immediately at home. However, the new version incorporates a number of 1988-style improvements over its predecessor.

Missing from **Meteors**, but features that have become standard in recent years, such as pause/restart, sound on/off and quit game, are present. Also, every hit has been spruced up with the addition of a four-pointed flash.

The game itself has also been radically improved. In **Cosmic Camouflage** a direct hit on a large asteroid does not always produce two smaller asteroids, it can produce an asterite and a Hermit Craft or occasionally two Hermit Crafts. These bounce around the screen at high speed causing fatal damage if hit.

They are worth destroying – self-preservation apart – so you can claim their valuable cargo. A vaporised Hermit Craft leaves behind a small cannister which increases your supply of rad-

Guardian



Compilation capers

Program: *Play It Again Sam 4*
Price: £9.95 (cassette)
Supplier: Superior Software, Regent House, Skinner Lane, Leeds, Yorks LS7 1AX.
Tel: 0532 459453



Cosmic Camouflage

lation bombs, warp drives or camouflage devices.

A radiation bomb is in effect a smart bomb, and acts like a panic button, splitting all the asteroids and destroying all asterites and alien ships. If the asteroids and aliens are closing in too quickly you can jump to another part of the screen. However, you reappear at a random position, sometimes with fatal consequences.

The Camouflage Cover feature which gives the game its name is very similar to the shield option in the original Atari Asteroids. When selected, your ship disappears and aliens no longer home in. However, you are not invulnerable to asterites. Later attack waves introduce Octanoids, Starcraft and Decanoids which home in on you, but are fairly easy to blast. Starcraft and Decanoids produce spores when blown up which also home in.

Cosmic Camouflage is a novel implementation of a classic, and if you enjoyed Meteors you'll love this upgrade.

The remaining games in the compilation are **Guardian** – originally released by Alligata, but now re-released on the Superior label – and Superior's own **Spellbinder**. The latter is another Superior offering that falls into the popular arcade-adventure category. It is, however, rather different from the other games of this type in that it puts less emphasis on the arcade aspect and more on adventure.

You play Eldon the Spellbinder, one of the Magelords, a brotherhood of wizards who rule the land of Lorraine. For many years peace and prosperity reigned over the land, but now that tranquility is being threatened by one of your own number, the renegade Zorn.

Naturally, as protectors of the land, the Magelords must act to thwart Zorn's evil plans before it is too late. Guess which one drew the short straw? You start on the drawbridge of Zorn's castle, and once you have ventured over the threshold there is no turning back.

The game features no material weapons, but a good wizard does not need any – you must fight Zorn using your own magical powers. However, before you can cast spells, you have to make them by mixing certain substances.

You start off with three spells in your armoury, but you will learn others along the way. Burned ashes, sulphur, toad's legs and the other substances all have magical properties that, correctly



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combined, will aid you in your quest.

The graphic features have been very well designed, with suits of armour, wooden tables and dusty bookcases all lending authenticity to your surroundings. My only complaint is that the animation of the monsters is rather jerky.

The layout of the castle seems to have been designed to confuse, and a map will come in handy. No medieval castle would be complete without secret passages and hidden doors, and the Castle of Lorraine is no exception.

As might be expected, Zorn is by no means the castle's only inhabitant. You will encounter a variety of deadly creatures, all of which deplete your precious energy by varying amounts if you don't protect yourself or avoid them.

These adversaries include zombies, flying eyes and winged skulls. You can cast a spell to immobilise or ward off some of them, but the supply of raw materials is not limitless.

The game is completely icon-driven. Press the appropriate function key to search an object, mix ingredients, cast a spell, and so on. Your surroundings are displayed in 3D, not using isometric projection, but viewed from the front.

Spellbinder runs in Mode 4, so only two colours are displayed on the screen at any one time. However, I found that this led to only a small reduction in visual clarity and I found no

difficulty in keeping track of my surroundings.

Spellbinder is not quite my cup of tea, but it is certainly very different, and if you like mapping and solving puzzles it is worth a close look.

Alligata is one of the longest established names in the software world, but one that has been dormant of late. This is set to change with the signing of a contract that allows Superior access to Alligata's back catalogue. The first title to come from this union is **Guardian** – an implementation of the coin-op classic Defender.

For the benefit of anyone who is not familiar with Defender – or its other Electron clones, Acornsoft's Planetoid and Micro Power's Gauntlet – you are charged with the task of defending your planet against swarms of alien invaders who are intent on kidnapping its inhabitants.

Same old scenario certainly, but it was original at the time. Defender was different from all the other games of the period because it featured sideways screen scrolling. Along the bottom of the screen is a jagged line representing the surface of your home planet. Dotted at intervals along it are a number of blips which represent the planet's inhabitants stranded helplessly on the surface.

Even as you start, wave upon wave of aliens are appearing in the skies above you, intent on capturing the humanoids in your care. The aliens will attempt to swoop down, capture a humanoid and take him off to the top of the screen. If one manages this successfully it becomes a mutant and chases your ship at high speed.

You must either shoot it or use one of your precious smart bombs. This will destroy every alien ship on the screen in one fell swoop and can be used as a panic button.

You start off with three lives, but are awarded an extra one after every 10,000 points. Ideally you should shoot the alien before it manages to make off with its prisoner. When you have destroyed a

Second Opinion

SUPERIOR has come up trumps again and produced another hit compilation to add to your collection. The only cloud on the horizon is the fact that as these games were so popular when originally released you may already have one or two of them as singles. However, I still think the package is worth every penny. Recommended.

Janice Murray

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complete wave of aliens you are awarded a bonus according to the number of humanoids remaining, so you must learn to hit the aliens without damaging their captives.

If the alien is still near the surface of the planet the humanoid will simply drop back to the ground unharmed. However, if the alien had managed to reach a considerable height above the planet, the humanoid will be killed. Therefore, you must also learn the worthwhile skill of catching falling humanoids in mid-air and re-

turning them to safety.

The displayed screen acts like a small window on the entire surface of the planet. Move left and right to cover the areas that are currently out of range. Fortunately, you have a long range scanner at the top of the screen to show you where you are needed most. This shows the positions of all the humanoids and aliens.

On later levels when the screen can be overrun with many different types of alien, a smart bomb can clear the area – and amass a considerable number of points – in no time. Guardian is an excellent implementation of a classic no Electron

owner should miss.

Overall this is another impressive compilation from Superior. The oldies are classics, and the newcomer is a variation on a classic so it's a compilation not to be missed.

Martin Reed

Sound.....	9
Graphics.....	9
Playability.....	9
Value for money.....	9
Overall.....	9

Program: Frankenstein 2000
Price: £1.99
Supplier: Atlantis Software, 28 Station Road, London
SE25 5AG.
Tel: 01-771-8642

Old flathead is back

A FEW of our more archaic readers may remember Frankenstein 2000, now receiving a second airing as a budget title. Having missed it first time around, I was eager to compare, dare I say, yet another oldie with the genre of today.

In Frankenstein 2000 you play Freddy Frankenstein, great grandson of the legendary Baron Frankenstein. The year is 2000 AD. On inheriting the castle of your infamous relative, you soon discover the incarcerated body of the legendary monster.

In the true spirit of your ancestors, the urge to restore life to the hapless creature takes over. You board a nuclear powered Discovery class submarine, and with the aid of modern technology are subsequently reduced to the size of a pin head. Now able to enter the body of the monster – Inner Space-fashion – your task can begin.

You have to reach the brain of the creature and repair the malfunctions that previously turned it into a homicidal killer. You enter the body through the trachea, your progress being monitored on a map of the creature's internal organs.

Here you encounter your first obstacle when bombarded by a host of little green frogs. At an early stage of the game you soon realise the importance of avoiding collisions at all costs. Contact with virtually anything other than legal targets has your damage indicator bleeping

towards a critical level.

Also it is essential to scan your oxygen supply. Surprisingly, you only have the one life, and failure to keep both instruments at an acceptable level will result in your untimely end.

You must navigate four organs on your way to the brain, and all adversaries and obstacles must be overcome. There is a mandatory stop after successful completion of each organ, where you are given the opportunity to replenish a rapidly depleting oxygen supply.

By now my first impressions that the game seemed a bit too easy had been well and truly squashed. And just wait until you reach the brain – this is simply murder. In fact, if I don't complete the mission this time, I think I'll leave the poor creature to the mercy of one of my future relatives.

I found the graphics well formed and the sprites large and easy to recognise. There wasn't much in the way of sound, just a few noises here and there. Perhaps this had something to do with the monster being tone deaf.

I was initially disappointed by the screen's sluggish scrolling and readers with a Turbo Driver will benefit here. However, in Turbo mode the submarine may be distorted on a few screens. Having said that, I found playing in normal mode hard enough.

I enjoyed playing Frankenstein 2000, in which you first imagine that things are going to be easy,



only to discover quite early on that you are not going to complete this mission without a great deal of practice and a whole bucketful of patience.

For those who missed this one first time around, enjoy a game that doesn't require the reading of a manual the size of War and Peace. As a budget title, this offers sound value for money.

Steve Bissell

Sound.....	4
Graphics.....	7
Playability.....	8
Value for money.....	6
Overall.....	8

Second Opinion

I THOROUGHLY enjoyed this game first time round and it is a welcome sight on a budget label. The graphics are good, the gameplay reasonably varied and it is quite addictive. If you haven't seen it before don't miss it second time round – you'll have lots of fun.

Janice Murray



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CITADEL
Marduk the evil dictator will have no chance as you are completely immortal and can pass through any door without a key. The death monks become harmless and you can even speed up the game to complete it in record time.

RAVENSKULL
Start immediately on any level without completing the others. Don't worry if you have any problems as you have infinite lives to keep you in the game right through to the end.

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Why not make Repton's life a little easier. All the passwords and edit codes. See the last 3 maps on every life. You'll have infinite lives & infinite time to complete every screen. Plus you'll be immortal to boulders, spirits and monsters.

CODENAME: DROID
Our cheats will help Commander Styker a great deal. You may move around at an amazing speed, and have infinite lives, infinite energy cells, infinite Blasterium energy and infinite passwords.

ICARUS
You may practice on any of the 20 levels whenever you want. Plus you'll have infinite credits and energy, and/or a fast blaster recharge.

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Examples of cheats in volume 3 :-

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Become a Master Clogger the easier way. Our cheats allow you to stop the clock and give you up to 255 lives. The deadly Cloggrass becomes harmless and you can use the drills almost as often as you like to remove unwanted obstacles.

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You will be the ultimate Barbarian with this infinite strength cheat. If you wish to make your struggle a little more interesting then you can leave yourself vulnerable to the deadly neckchop.

SHARK
These cheats allow you to both increase & decrease the difficulty of Shark. Set the shots needed to destroy trucks, helicopters & the alien spaceship and then choose the weaponry and extra abilities you want to help you with your task.

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Product: Joe Blade

Price: £2.99

Supplier: Players, Calleva Park, Aldermaston, Berkshire RG7 4QW.

Tel: 07356 77421

IN this arcade adventure from Players you take the part of the man of steel of the game's title—Joe Blade. Brought up in a Tibetan monastery, and a pop idol and teenage pin-up to boot, you are a tough, fearless character whose very name strikes terror in the heart of all gangsters, assassins and terrorists.

With references like these you are the ideal person to take on a rescue mission for the government which is being blackmailed for 30 billion dollars by Crax Bloodfinger. This dastardly character has kidnapped six world leaders and is currently holding them for ransom in his massive fortified HQ somewhere in Central America.

You head for his hideout armed with just a semi-automatic machine gun, and the game starts as you are about to enter. Making your way through the nearest conveniently open door you enter Bloodfinger's HQ to be confronted by an armed guard.

Not surprisingly, it turns out that the place is crawling with them, but they are no match for Joe Blade, and a quick blast with your machine gun soon disposes of anyone who gets in your way.

Quickly dashing from room to room you discover that most of the doors are locked, but fortunately several keys have been left lying around by absent minded guards, and these can be put to good use. You'll find other useful items of equipment too, like food and drink, and a guard's uniform that can be used as a disguise.

Eventually you will discover one of six booby

JOE to the rescue



At the exit to Crax Bloodfinger's HQ

trapped bombs which must be activated before you escape with the hostages in order to destroy Bloodfinger's base. On encountering a bomb the game switches to a puzzle screen which consists of the letters A to E printed in random order. Two letters at a time can be exchanged and the object is to sort them into alphabetic order.

The graphics are superbly detailed and are drawn in glorious Mode 4 monochrome. The lack of colour doesn't spoil the game, as the backgrounds and sprites are very impressive. Joe Blade and the enemy characters walk quite convincingly in front of the background and other objects on the screen giving the display a good feeling of depth.

Only about one third of the screen is used as the playing area and the action is shown side on. You walk left or right, and can enter doors into or out of the screen. You can also jump, but I haven't found a need for this yet as you can't leap on to the top of any of the objects lying around.

The sound is fairly primitive, merely consisting

of a beep when Joe walks or fires his gun. Apart from this I found it a very enjoyable game, and one that I will play for quite some time to come.

Roland Waddilove

Sound	6
Graphics	9
Playability	8
Value for money	9
Overall	8

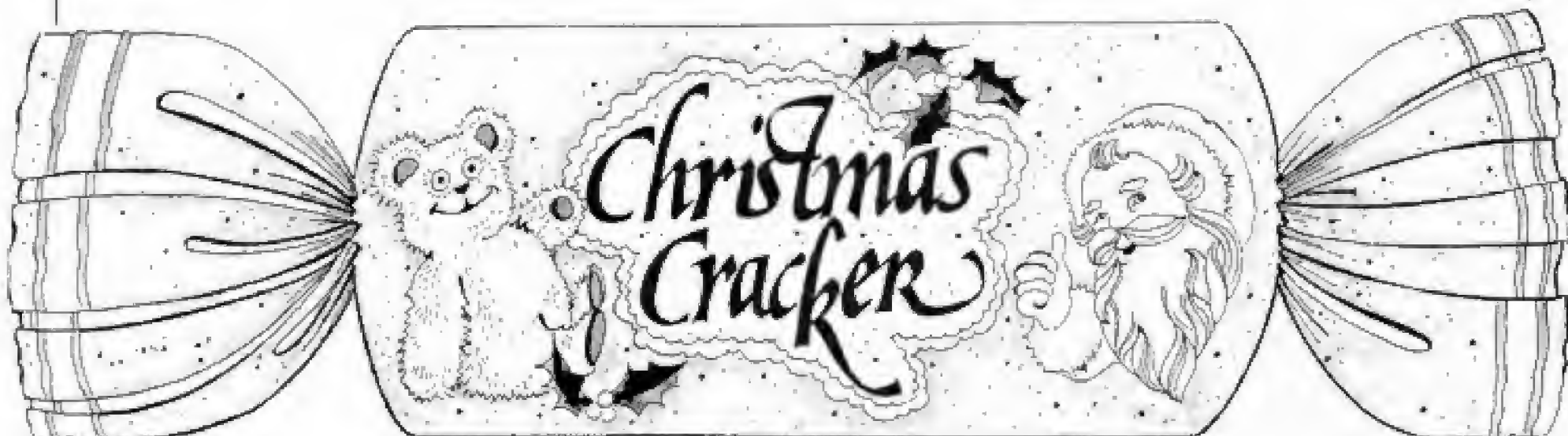
Second Opinion

THE graphics are excellent, but I wish Players would improve that appalling sound. Surely it wouldn't be too difficult to add a short tune, or a few more sound effects? In spite of this, I still found it an enjoyable escapade and it deserves to do well.

Janice Murray



Releasing the prisoners



Help Santa collect some last minute presents in Alan Weatherill's game

SANTA'S Workshop is a game specially written for our younger readers, with a traditionally Christmas theme. It's Christmas Eve, and all Santa's helpers have gone home to be with their families. Most of the toys and presents have been put into sacks or safely loaded on to the sleigh, with the exception of a few last minute orders.

It is normally the elves' job to bring the toys and presents to Santa. However, as toyland now has a new work-to-rule contract, came five o'clock it was "High-ho, high-ho, it's home from work we go". Poor old Santa has been left alone in the toy factory, and now must find the last 50 teddy bears and presents left scattered around by the work-shy elves.

The factory looks strange in the evening's dim artificial light. Some weird and not-so-wonderful things have been known to happen after lights-out. Stories of magic crackers and wild unfriendly Christmas puddings have been whispered around the workplace.

Of course, silly rumours are not going to stop

our Santa collecting all of the teddy bears and presents - some children will have no Christmas without them. So, with your help to guide Santa around the factory, there will be a Christmas for everybody after all, won't there?

When your child has solved the game you may be feeling devious enough to want to set an even harder challenge. Alternatively, if your child keeps getting stuck perhaps a simpler version may be in order. The layout for the screen is

to ensure that your design is also of the same dimensions. Also take particular care that each character used is placed in a position that will reflect its purpose in the game. That is to say, there would be no point placing a space at the edge of the screen as you may be able to walk right out of the game.

The table shows the data numbers used in the program, along with a brief description of each character's purpose:

No.	Object	Function
0	Space	A clear corridor for you to walk in
1	Brick wall	Solid object
2/3	Santa's sleigh	Solid object
4	Sack of toys	Solid object
5	Christmas cracker	If hit, will send you back to the start
6	Teddy bear	You must collect this
7	Present	You must collect this
8	Xmas pudding	If hit, changes into a nasty little creature that duplicates vertically where possible, thus blocking clear passages
9	Sprite for Santa	

taken from the data statements found at lines 3240-3410, and it is a simple matter to change these values to ones to suit your needs.

The playing area of the screen is mapped as an 18 x 18 character matrix, and care must be taken

There are 50 toys and presents to collect - remember to include the same total of teddy bears and presents in your own versions. This number can be altered by changing the 50 held in line 2020.

```

10 REM Santa's Workshop
20 REM By A.D.Weatherill
30 REM (c) Electron User
40 MODE6
50 ON ERROR IF ERR<>17 MODE6:DSCLI
FX12:REPORT:PRINT at line 7:ERL:END
ELSE RUN
60 HIMEM=HIMEM-81900
70 start=HIMEM:FX11,10

```

```

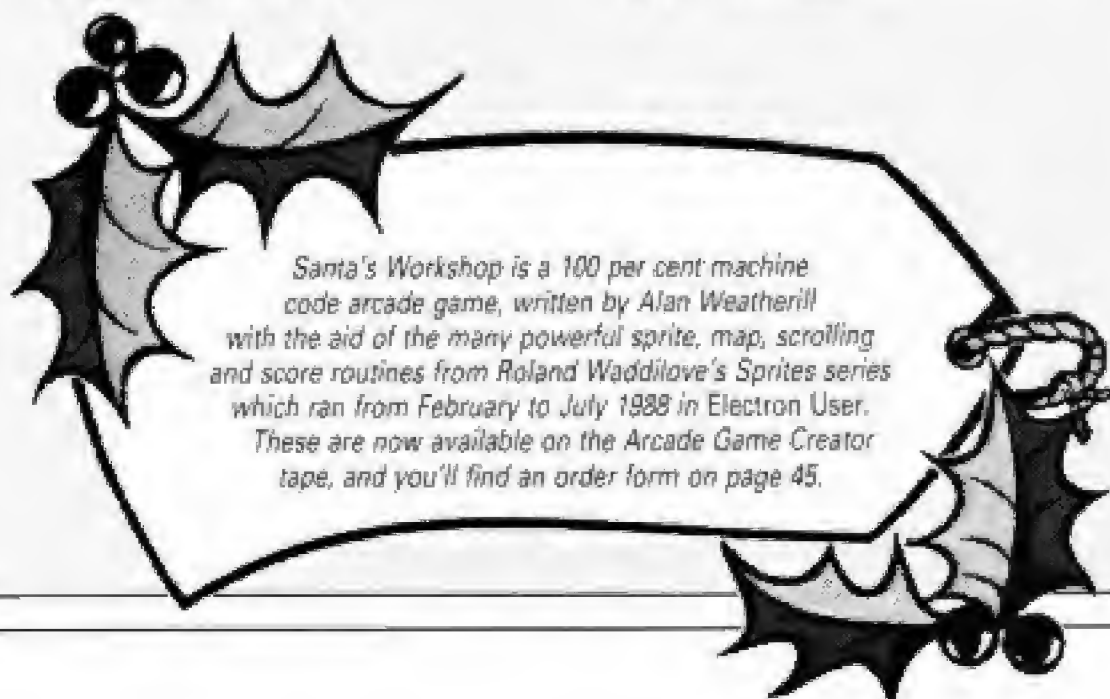
80 PRINTTAB(7,15)'Please wait a few
seconds'
90 VDU23,1,0;0;0;0;
100 PROCassemble:FX16
110 MODE 5:VDU23,1,0;0;0;0;
120 PRINT TAB(2,1)'Santa's Workshop'
TAB(3,5)'Press: A Z < >'
130 VDU 28,4,25,15,9:COLOUR 131:CLS
140 VDU 28:COLOUR 128

```

```

150 COLOUR2
160 PRINT TAB(4,29)'SCORE: 00'
170 !pos=85800+5*16+10*8140
180 CALL start:FX12
190 PROCmusic:FX21
200 END
210
220 DEF PROCassemble
230 osurch=1820E
240 sc=849
250 index=850
260 tindex=851
270 addr=852
280 xcount=854:ycount=855
290 neu=856
300 xcoord=858:ycoord=859
310 temp=85A
320 pos=85C
330 yone=860:xone=861
340 oldy=862
350 tempy=863
360 man=864
370 FOR pass=0 TO 2 STEP 2
380 P1=start
390 [ OPT pass
400 LEX #0:STX sc:STX man:STX xcoord

```



Santa's Workshop is a 100 per cent machine code arcade game, written by Alan Weatherill with the aid of the many powerful sprite, map, scrolling and score routines from Roland Waddilove's Sprites series which ran from February to July 1988 in Electron User. These are now available on the Arcade Game Creator tape, and you'll find an order form on page 45.

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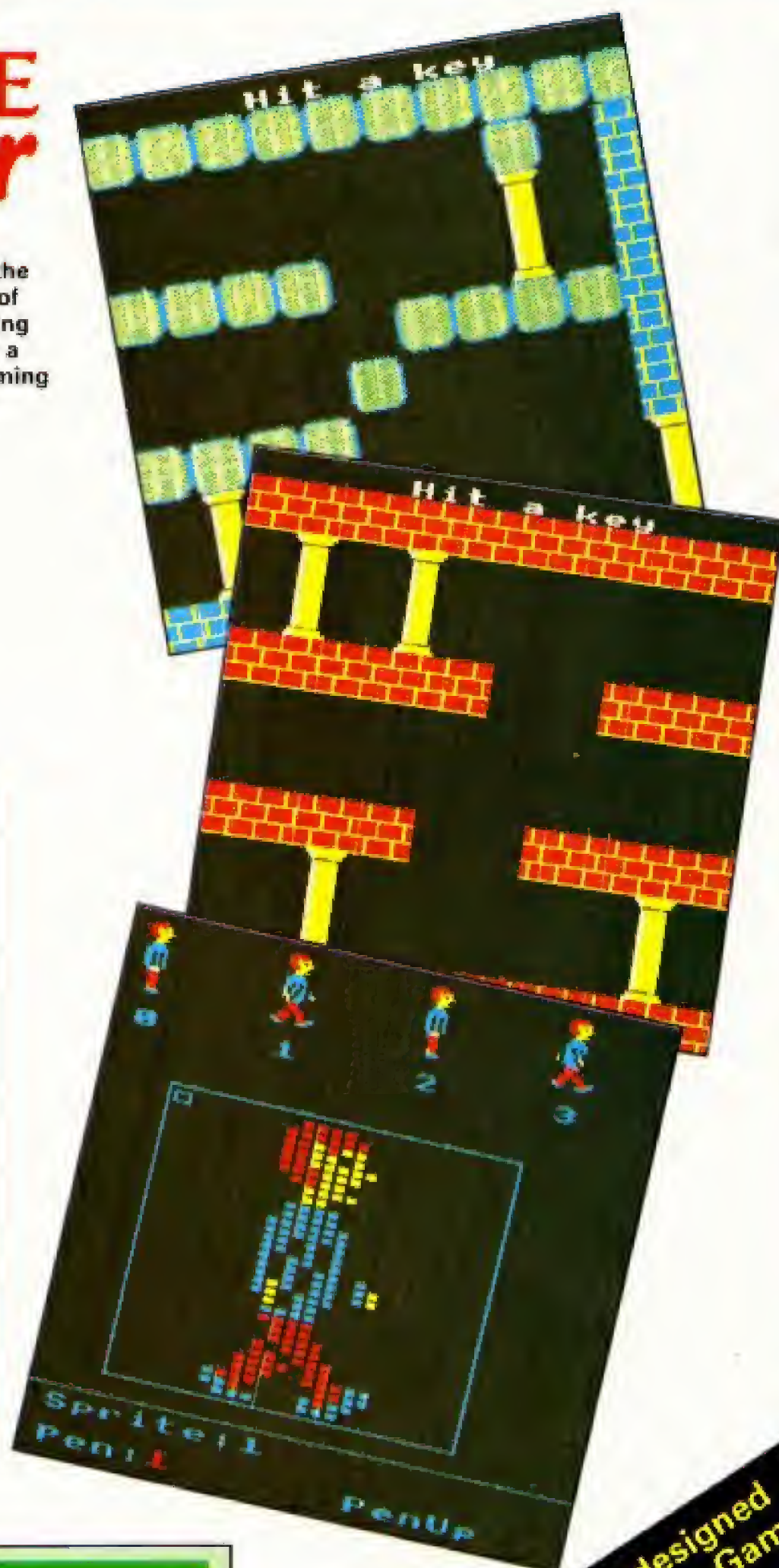
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FLOATING point machine code maths has always been shrouded in mystery, and unfortunately many people are under the misapprehension that it is a very complex and difficult topic only understood by whizz kids and boffins. It isn't, as I'll show, and once you've got to grips with the basic principles the rest is easy.

The Basic rom uses two areas of memory as general purpose scratchpads when performing calculations, and these are called FPA and FPB. Both are located in zero page for speed, the former at &2E to &35, and the latter at &3B to &42. It isn't necessary to understand how floating point numbers are stored in FPA and FPB – Table I is a brief summary – but if you are interested you'll find a full explanation in the September 1987 issue of *Electron User*.

One fact you need to remember is that floating point numbers are normally stored in memory in a compacted five byte form, and when they are used in calculations they are expanded to eight bytes.

Program I is a simple example that shows how to pass a floating point variable to a machine code subroutine. It then expands it into FPA and tests the value to see whether it is zero, positive or negative – printing out the appropriate message.

Line 310 jumps to the machine code with CALL &900,a where a is the floating point variable. Basic stores the addresses of all the parameters passed to a machine code routine in a parameter block at &600, and the layout of this is shown in Table II.

The address of a is copied to &4B/&4C and a JSR to *ldfam* at &A3B5 expands the value and places it in FPA. A JSR to *testfa* at &A1DA tests FPA and returns with the zero flag set if the number is zero and the negative flag set if it is less than zero.

Another quite simple, but important task is to negate a floating point number, and Program II shows how this may be done. The variable a is expanded into FPA as before and a JSR to *negfa* at &AD7E negates it – that is, if it is positive it is made negative, but if negative it is made positive.

Finally, the result is copied back into the variable a – and compacted at the same time – by storing its address at &4B/&4C and calling *stfam* at &A3BD.

Program III is slightly more complex – adding two floating point numbers together. This time two parameters are passed to the machine code, a and b. The first is expanded into FPA and the second is expanded into FPB. A JSR to *addfba* at &A50B adds FPB to FPA and the result is copied and compacted into a as before.

Program IV demonstrates floating point subtraction. However, we have to be quite devious here as there isn't a specific subroutine to perform this calculation. What we do is negate the number we want to subtract and then add it to the first number.

The first task is to unpack the two numbers passed as parameters – a and b – into FPA and FPB as before. Then FPA is negated and FPB added to it. Finally, the result is copied back to the variable a.

The two remaining floating point operations are multiplication and division. I'm not going to demonstrate these as they are exactly the same as addition in Program III. Simply replace *addfba* at &A50B with either *mulfab* or *divfab* at &A613

Take my point, floating is easy...

Roland Waddilove reveals the way to manipulate floating point numbers in the final part of his guide to the Basic rom

and &A6F1 respectively to multiply or divide FPA by FPB. You will have noticed in the programs that an extra call is made to *nmifa* after each calculation. This is to "normalise" the result.

Basically, it stops bits falling off the end of bytes in calculations and ensures the top bit of the most significant byte of the mantissa is set.

And that rounds off our look at Basic rom routines. Armed with these you should now be able to perform integer and floating point arithmetic, handle variables and detokenise Basic programs.

Address	Use
&2E	Sign byte
&2F	Exponent overflow byte
&30	Binary exponent (offset by &80)
&31	Mantissa (MSB)
&32	Mantissa
&33	Mantissa
&34	Mantissa (LSB)
&35	Mantissa low order rounding byte

Table I: The layout of Basic's floating point workspace

```

10 REM Program I
20 REM Test FPA
30 ldfam=&A3B5
40 tstfa=&A1DA
50 pblock=&600
60 FOR pass=0 TO 2 STEP 2
70 P1=&900
80 [ OPT pass
90
100 \Unpack a into FPA
110 LDA pblock+1:STA &4B
120 LDA pblock+2:STA &4C
130 JSR ldfam
140
150 \Test FPA
160 JSR tstfa
170
180 BEQ zero
190 BPL plus
200 LDA #2:JMP exit
210 .zero
220 LDA #0:JMP exit
230 .plus
240 LDA #1
250 .exit
260 STA &70
270 RTS
280 ]
290 NEXT
300 INPUT "Number";a
310 CALL &900,a
320 IF ?&70=0 PRINT "Zero"
330 IF ?&70=1 PRINT "Positive"
340 IF ?&70=2 PRINT "Negative"

```

Program I

Address	Use
&600	Number of parameters
&601	1st parameter address (low)
&602	1st parameter address (high)
&603	1st parameter type
&604	2nd parameter address (low)
&605	2nd parameter address (high)
&606	2nd parameter type
&607	3rd parameter ...

Table II. The parameter block used by Basic's CALL statement

10 REM Program II	110 \Unpack a into FPA	210 LDA pblock+2:STA &4C
20 REM Negate FPA	120 LDA pblock+1:STA &4B	220 JSR stfam
30 ldfam=&A3B5	130 LDA pblock+2:STA &4C	230
40 negfa=&A07E	140 JSR ldfam	240 RTS
50 stfam=&A380	150	250 I
60 pblock=&600	160 \Negate FPA	260 NEXT
70 FOR pass=0 TO 2 STEP 2	170 JSR negfa	270 INPUT "Number";a
80 PT=&900	180	280 CALL &900,a
90 I OPT pass	190 \Store result in a	290 PRINT "Result=";a
100	200 LDA pblock+1:STA &4B	

Program II

10 REM Program III	210 JSR ldfbm	230
20 REM Floating point addition	220	240 \Negate FPA
30 ldfam=&A3B5	230 \Add FPB to FPA	250 JSR .egfa
40 ldfbm=&A34E	240 JSR addfba	260
50 nmlfa=&A303	250	270 \Add FPB to FPA
60 addfba=&A50B	260 \Normalise result in FPA	280 JSR addfba
70 stfam=&A380	270 JSR nmlfa	290
80 pblock=&600	280	300 \Normalise result in FPA
90 FOR pass=0 TO 2 STEP 2	290 \Store result in a	310 JSR nmlfa
100 PT=&900	300 LDA pblock+1:STA &4B	320
110 I OPT pass	310 LDA pblock+2:STA &4C	330 \Store result in a
120	320 JSR stfam	340 LDA pblock+1:STA &4B
130 \Unpack a into FPA	330	350 LDA pblock+2:STA &4C
140 LDA pblock+1:STA &4B	340 RTS	360 JSR stfam
150 LDA pblock+2:STA &4C	350 I	370
160 JSR ldfam	360 NEXT	380 RTS
170	370 INPUT "1st number";a	390 I
180 \Unpack b into FPB	380 INPUT "2nd number";b	400 NEXT
190 LDA pblock+4:STA &4B	390 CALL &900,a,b	410 INPUT "1st number";a
200 LDA pblock+5:STA &4C	400 PRINT "Result=";a	420 INPUT "2nd number";b

Program III

Program IV

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COMPUTING IN ACTION

**Barry Wood presents
a useful program to
calculate the cost
of a phone call**

THERE are always arguments in our household whenever the phone bill arrives and we find it higher than expected. The worst thing is that no one will own up to making the calls! This utility was written to cut the cackle and keep track of the cost of each call.

Before you make a call you run this program which will display the cost of the call, updating it every second. It's quite surprising the amount that you can save, not simply by cutting short the call, but also by using the way BT calculates the cost to your own advantage.

The cost is worked out according to the number of time units used. For instance, when you dial a local number at the weekend you'll be charged one unit as soon as the call is connected, and you won't be charged another unit for 360 seconds.

So if you end your call before your 360 seconds are up the call will cost one unit - 5.06p in this case. However, even if the call lasts just one second more than the allotted 360 you'll be charged another unit - so you may as well make the most of it and use the time you've just been charged for to continue your conversation for another 359 seconds.

The utility asks you several simple questions about the time of day and the destination in order to calculate the cost of the call.

When you are connected it will count down in seconds displaying the time left until you are charged for the next unit. To cut your bill hang up just before the current unit's time runs out, otherwise you'll be charged for the next one.

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		TOTAL		
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Enter phone rate				
Selected units (See overhead)	date	meter no.		
	12 JUN	0030		
	11 SEP	0032		
	UNITS AT 4.			
TOTAL (EXCLU		Rate		
VALUE ADDED TAX AT 15.00%		5.52	Entering the rate	
TOTAL PAYABLE		27.03		
*** Phone Call Calculator ***				
Cost so far = 5 pence				
Time remaining 360 seconds				
Press 5 to stop				
XJR PAYMENT				
Initials				
Calculating the cost				

```
10 REM Phone Call Calculator
20 REM By Barry Wood
30 REM (c) Electron User
40 REM Charge=5.06p/unit
50 unit=5.06
60 MODE 1
70 *FX213,200
80 VDU 19,1,6;0;
90 PRINT TAB(0,5)*** Phone Call Calculator ***
100 COLOUR 2
110 PRINT TAB(0,10)1. Local call
120 PRINT TAB(0,12)2. Long distance
  - major towns
130 PRINT TAB(0,14)3. Long distance
  - other towns
140 PRINT TAB(0,16)4. Channel Islands & Isle of Man
150 PRINT TAB(0,18)5. Mobile telephone
160 PRINT TAB(0,20)6. Ireland
170 PRINT TAB(0,24);
180 COLOUR 1
190 INPUT "Enter type of call: type
200 CLS:COLOUR 3
```

```
210 PRINT TAB(0,2)*** Phone Call Calculator ***
220 COLOUR 1
230 PRINT TAB(0,6)Enter phone rate.
....
240 COLOUR 2
250 PRINT TAB(0,10)1. Cheap.....
Mon-Fri 6pm-8am/Sat+Sun
260 PRINT TAB(0,12)2. Standard....
Mon-Fri 8am-9am/1pm-6pm
270 PRINT TAB(0,14)3. Peak.....
Mon-Fri 9am-1pm
280 COLOUR 1
290 PRINT TAB(0,18);
300 INPUT "Rate:rate
310 FOR i=1 TO type
320 FOR j=1 TO rate
330 READ time
340 NEXT
350 NEXT
360 CLS:COLOUR 3
370 VDU 23,1,0;0;0;0;0;
380 PRINT TAB(0,2)*** Phone Call Calculator ***
390 PRINT TAB(0,16)Press 5 to stop
```

```
400 end=FALSE
410 cost=0
420 REPEAT
430 VDU 7
440 TIME=0
450 cost=cost+unit
460 REPEAT
470 TX=time-(TIME DIV 100)
480 COLOUR 2
490 PRINT TAB(0,8)Cost so far = ;I
NT(cost); pence
500 COLOUR 1
510 PRINT TAB(0,12)Time remaining =
;TX; seconds ;
520 IF INKEYS0="S" end=TRUE
530 UNTIL TX<1 OR end=TRUE
540 UNTIL end
550 DATA 360,90,60
560 DATA 100,34.3,25.7
570 DATA 60,30,22.5
580 DATA 45,24,18
590 DATA 12,0,8
600 DATA 12,0,8
```


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|-----------------|--|
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|-----------------|---|
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- | | |
|--------------|--|
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| Temperature: | Work out the temperature shown on the thermometer. |
| Mass: | Read the correct balance scale |
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BLOW THIS FOR A GAME!

Let your fingers do the blowing in Steve Bissell's adaptation of that popular indoor sport – blow football

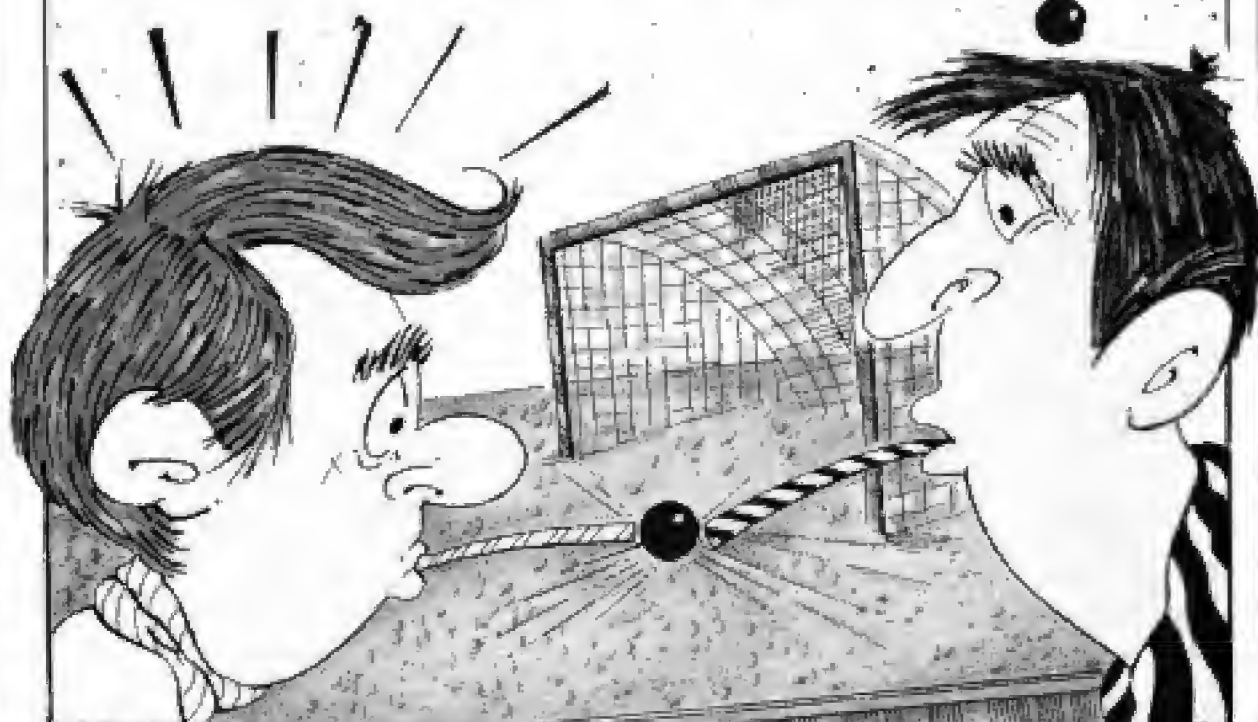
BLOW FOOTBALL is a two player game that usually leaves everybody involved completely out of breath. However, if your friend is a bigger windbag than you, don't worry – in this computerised version of the game, the only thing you might have to blow will be your aching fingers.

The screen shows a bird's eye view of the pitch, with player one going down the screen and player two coming up. The rules are simple – each player has three keys with which he can move the ball. To avoid either player having an unfair advantage, they have been set so they will not auto-repeat.

Holding down a key will not do you any good. Indeed, the only way you can move the ball is to tap the appropriate key as quickly as possible. If no keys are pressed there will be some sideways movement of the ball, due to a slight breeze in the stadium.

The first player to score five goals wins the match. A record of the current scores, along with the total matches won so far, is displayed throughout. At the start of the game you can settle how many matches the game will last, or simply play until one of you gives up with finger fatigue.

All that needs to be done now, is for you to massage your fingers and prepare yourself for some fast and furious action.



GAME ON TAPE JAN '90

```

10 REM Blow Football
20 REM By Steve Bissell
30 REM (c) Electron User
40 MODE 1: *FX11
50 PROCinstructions: *FX202,32
60 MODE 5: *FX36
70 PROCscreen
80 PROCscore
90 REPEAT
100 COLOUR 131: COLOUR 0
110 REPEAT
120 PROCrandom
130 *S=INKEY$0
140 PROCplayer
150 PROCmoveball
160 IF Y% = 1 OR Y% = 29 PROCscore
170 UNTIL sc1% > 4 OR sc2% > 4
180 PROCendgame
190 UNTIL INKEY = 86: COLOUR 128: MODE 6
: *FX12
200 END
210 DEFPROCinstructions
220 VDU 23,1,0;0;0;0;
230 FOR i2=1 TO 5: READ x,y,x1,y1,c
240 GCOL 0,c: MOVE x,y: DRAW x1,y: DRAW
x1,y1: DRAW x,y1: DRAW x,y
250 NEXT
260 COLOUR 131: COLOUR 0: PRINTTAB(12,
43)STRING$(15,"")TAB(12,5) "BLOW FOOTB
ALL TAB(12,6)STRING$(15,"")
270 COLOUR 128: COLOUR 3: PRINTTAB(2,9
) Each player can move the ball in any
TAB(2,11) "one of three forward direct
ions, by"
280 PRINTTAB(2,13) "pressing keys as
quickly as possible: COLOUR 2: PRINTTAB
(5,15) "To ensure a fair game the keys"
TAB(10,18) "WILL NOT auto-repeat"
290 COLOUR 129: PRINTTAB(6,21) "PLAYER
1: COLOUR 130: COLOUR 1: PRINTTAB(26,21
) "PLAYER 2"
300 COLOUR 128: COLOUR 2: PRINTTAB(3,2
4) S = Down TAB(3,26) L = Left + Down
TAB(3,28) X = Right + Down
310 COLOUR 1: PRINTTAB(23,24) "+" = Up
TAB(23,26) ">" = Left + Up TAB(23,28) "?"
= Right + Up
320 keys = GET: VDU 7
330 ENDPROC
340 DATA 374,788,872,904,1,0,0,1279,
1023,3,11,11,1266,1012,2,19,19,1256,10
00,1,31,31,1247,991,3
350 DEFPROCscreen
360 t1% = 0: t2% = 0
370 VDU 23,35,170,85,170,85,170,85,1
70,85,23,38,0,24,60,60,60,60,24,0
380 COLOUR 129: COLOUR 2: PRINTTAB(6,0
) "PLAYER 1: COLOUR 130: COLOUR 1: PRINT
43(6,30) "PLAYER 2"
390 COLOUR 131: COLOUR 3: PRINTTAB(0,0
) "SETAB(0,30) SC

```

CONTROLS

	Player 1
S	Down
Z	Left+down
X	Right+down
	Player 2
+	Up
>	Left+up
?	Right+up

VARIABLES

X%,Y%	Position of the ball
H%,V%	Movement of the ball
A%,B%	Temporary position of the ball
sc1%	Player 1 score
sc2%	Player 2 score
t1%	Games won so far player 1
t2%	Games won so far player 2

PROCEDURES

instructions	Print instructions
screen	Draw the screen
score	Update score
player	Get players' moves
moveball	Move the ball
endgame	Game over routine

Turn to Page 32 ▶

◀ From Page 31

```

400 COLOUR 0:PRINTTAB(16,0)TTAB(16
,30)T"
410 PRINTTAB(0,1)*****
**::FOR I%=2 TO 28:PRINTTAB(0,I%)*
**::NEXT:PRINTTAB(0,29
)*****
420 PRINTTAB(9,15)B":XX=9:YY=15:sc1
X=0:sc2X=0
430 VDU 23,1,0;0;0;0;
440 ENDPROC
450 DEFPROCrandom
460 IF RND(10)>2 HX=0:VX=0 ELSE HX=R
ND(3)-2:VX=0
470 ENDPROC
480 DEFPROCplayer
490 IF K$="1" HX=-1:VX=1:ENDPROC
500 IF K$="X" HX=1:VX=1:ENDPROC
510 IF K$="S" VX=1:ENDPROC
520 IF K$="." HX=-1:VX=-1:ENDPROC
530 IF K$="/" HX=1:VX=-1:ENDPROC
540 IF K$=";" VX=-1:ENDPROC
550 ENDPROC
560 DEFPROCmoveball
570 AX=XX+HX:BX=YY+VX
580 IF AX<1 OR AX>18 ENDPROC
590 IF BX<2 AND (AX<8 OR AX>11) ENDP
ROC
600 IF BX>28 AND (AX<8 OR AX>11) END
PROC
610 PRINTTAB(XX,YY)TTAB(AX,BX)B"
620 KX=AX:KY=BX
630 ENDPROC
640 DEFPROCscore
650 IF Y%1 sc2X=sc2X+1
660 IF Y%29 sc1X=sc1X+1

```

```

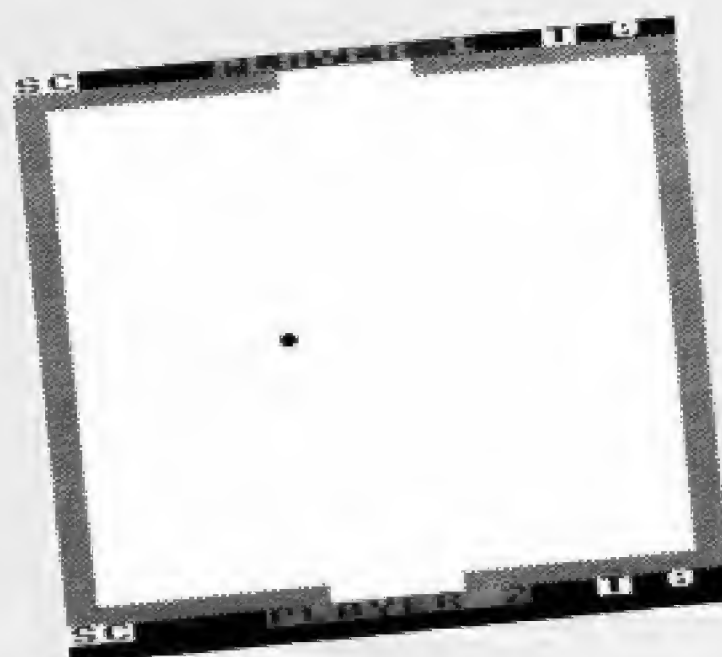
670 FOR I%=1 TO 5:FOR I1%=100 TO 50
STEP -20:SOUND 1,-15,I1%,1:NEXT:NEXT
680 PRINTTAB(X%,Y%)":X1=9:Y1=15:*F
X21
690 COLOUR 128:COLOUR 1:PRINTTAB(3,0
);sc1XTTAB(3,30);sc2X"
700 COLOUR 3:PRINTTAB(18,0);T1TAB(1
8,30);T2X;
710 COLOUR 131:COLOUR 0
720 ENDPROC
730 DEFPROCendgame
740 IF sc1X>sc2X T1X=T1X+1 ELSE T2X=

```

```

T2X+1
750 X1=9:Y1=15:sc1X=0:sc2X=0
760 PROCscore
770 TIME=0:REPEAT:TX=TIME/100:UNTIL
TX>1:COLOUR 131:COLOUR 0:PRINTTAB(3,14
)ANOTHER GAME?TAB(6,16)Yes/No)
780 FOR I%=100 TO 250 STEP 25:SOUND
2,-15,I%,2:NEXT:*FX21
790 keys=GET
800 PRINTTAB(3,14)STRING$(14,"TTAB
(6,16)STRING$(7,"TTAB(9,15)B"
810 ENDPROC

```



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Electron User

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STOP PRESS

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June 1988 issue:

Games: Fibonacci Nim, Bomb Alert. **Features:** Adventure hints and tips, four-page pullout guide to software, memory map part 2, Viewsheets guide. **Utilities:** Procedure and function lister, shadow ram routines, car route database. **Programming:** Machine code tutorial part 4, writing scrolling map routines.

July 1988 issue:

Games: Knockout Whist, Randall Rabbit, Tilley the Train, Tennis. **Utilities:** Shadow ram filling system, machine code score routines, Easy Reader. **Reviews:** Advanced Plus, Spycat. **Features:** Machine code tutorial, adventures, Memory Map part 3.

August 1988 issue:

Games: Fox and Geese, Solitaire. **Utilities:** Mini Prolog, disassembler. **Reviews:** E00 ADFS, Repton Thru Time, Barbarian, Romplus-144. **Features:** Machine code tutorial adventures, Memory Map part 4.

September 1988 issue:

Games: Fire!, Bulls and Cows, Crypton, Oxo. **Utilities:** Sprite routines, Listif. **Reviews:** Anarchy Zone, Stranded, Round Ones, Times Computer Crosswords, Advanced User Guide. **Features:** Basic rom routines revealed, adventure tips.

October 1988 issue:

Games: Pistol Shooting, Spencer Spider, Gobbler. **Utilities:** Scroller, Rom Manager. **Features:** Rom routines revealed, adventure tips, Plus 1 hardware project. **Reviews:** Music 5000, Shark, Breakthrough, Plane Crash, Golf, Darts, Control Applications of Micros.

November 1988 issue:

Games: Rally Driver, Bomber. **Utilities:** Elite Cheat, Disc and rom routines. **Features:** Using the Hybrid Music System, Adventure tips, Heyley interview. **Reviews:** Triple Deckers, Cheat it again Joe, Pipeline, Rebel Planet, In Search of Atahaulpa, DIY service manual.



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May 1988:

Lion's Lair, Keyboard Gremlins, French to English translator, machine code map display routines.

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Fibonacci Nim, Bomb Alert, Procedure and function lister, car route database, scrolling map routines.

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Knockout Whist, Randall Rabbit, Tilley the Train, Tennis, machine code score routines, Easy Reader.

August 1988:

Fox and Geese, plus Solitaire board games, Mini Prolog, machine code disassembler.

September 1988:

Crypton, Fire, Oxo, Lister, sprite utilities, Listif.

October 1988:

Aussie Suds Part 1, Pistol Shooting, Spencer Spider, Gobbler, rom routines.

TO ORDER PLEASE USE THE FORM ON PAGE 45

SENET is a two-player board game which was popular in ancient Egypt – there is evidence from tombs that it is well over 3000 years old. It was played by all classes. The aristocracy played it on fine boards made of rare woods, ivory and faience (decorated earthenware and porcelain), while the peasants may have played it on nothing more than a board marked out in the sand, or scratched on a stone, using pebbles for counters.

It is basically a race game for two players – rather like Ludo – and each player tries to move all his counters round the board and on to the last square where they are removed. Each player has five counters, either all red or all blue.

The playing counters move over the track marked out on the board as the ox ploughs – first to the right then to the left and so on. The track squares are labelled A-Z and 1-5 on screen, and you progress through the alphabet and then on to the numbers.

Initially the counters are placed alternately red and blue on the first 10 squares. The players' colours are determined by throws of the dice.

To start the game, the players each throw the dice until one of them throws a one. This player has the square blue counters, and the other has the round red ones. The blue counter on square J is automatically moved to square K, and after the first move blue continues to throw the dice.

If he throws one, four or six he can move any of his counters the indicated number along the track then throw again. If he throws a two or three he moves a counter the indicated number of squares and play passes to the other player.

The second player (red) must make his first move from square I, or if the counter on that square has been moved by blue, from the next lower square containing a red counter, but with subsequent throws of the dice may move any of his playing counters. Each turn ends with a throw of two or three.

Two counters cannot occupy the same square, and if one lands on a square occupied by an opponent's counter the latter is said to be under attack and is moved back to the square just vacated by the counter in play. In other words, they are exchanged.

If two counters of the same colour occupy consecutive squares they protect each other and cannot be attacked. Three counters of the same colour on consecutive squares form a protected blockade, and they can neither be attacked nor passed by enemy counters. However, they don't block the passage of counters of the same colour.

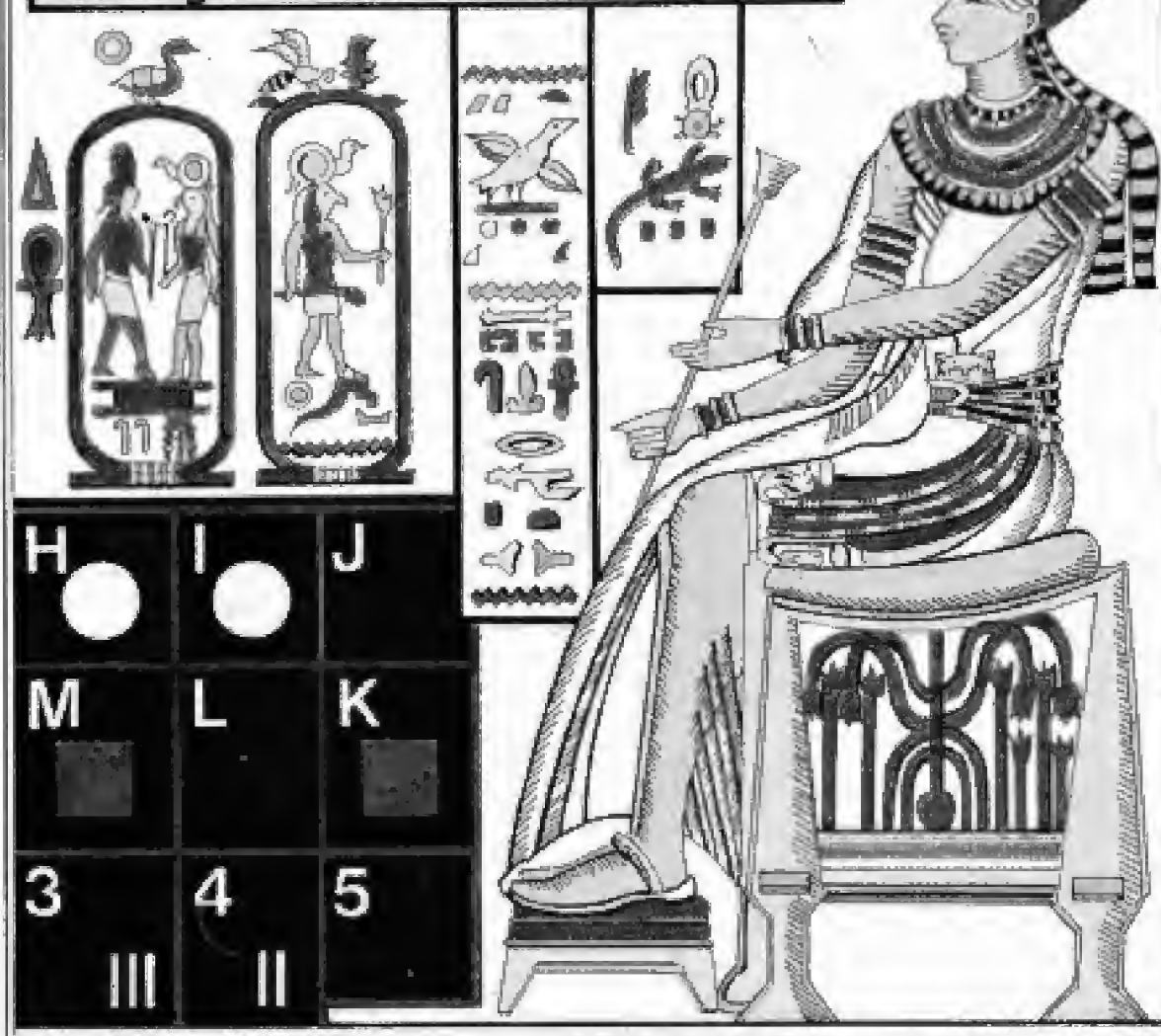
The five numbered squares at the end of the track have special significance. Square two marked with an X is a trap. Any counter which lands here must return to the first vacant square on the board and begin the journey again. Squares one, three and four – marked with hieroglyphics – are havens where counters are not vulnerable to attack.

If it is impossible to move any man forward the turn ceases. Pressing Z will pass the turn on to the other player unless there is a counter that could be moved, but would fall into the trap (X). Such cheating will not succeed, and the counter will be moved back to the start in the normal trap sequence.

When a player has moved all his counters into the last (exit) row, he may take them off by landing them exactly on the last square numbered five. If any of the counters on the exit row are

GAME OF THE PHAROHS

Arthur Lindon introduces an ancient board game from the Middle East



attacked or thrown back to the first or second row, the counters of the same colour which remain on the board may not be taken off until the lagging counter returns to the third row.

The player who first moves all his counters off the board is the winner.

It sounds a very complex game, but surprisingly, is quite easy to learn. If you're not sure which counter to move try pressing any of the keys with one of your counters on. The game is well error trapped and won't let you make a wrong move.

The number of squares you can move a counter is determined by throws of four two-sided dice, and these are unusual. One side is red and the other white and the scores produced are as follows:

One white side up	1
Two white sides up	2
Three white sides up	3
Four white sides up	4
Four red sides up	6

The probabilities of these scores occurring are four, six, four, one and one respectively, out of 16 throws. This has been verified by practical experiment to be very accurate over a large number but, of course, may not appear so over a small

quantity.

In a nutshell, move your counters round the board to the number five square. You can land on an opponent's counter on its own, but not if there are two or three in a row. You can jump over any counters in the way, except when your opponent has three in a row.

Turn to Page 48 ▶

VARIABLES

C%() The colour of each square.
 NS%() The players' names.
 K%() The counter to move.
 T%() The score on the four dice.

PROCEDURES

PROCthrow Throw the dice
 PROCchoice Read the keyboard
 PROCmove Move the counter
 PROCgo Main game loop
 PROCpass Skip go if Z pressed
 PROCpause A short delay.

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MICRO MESSAGES

Too full for words

I HAVE owned an Electron from the day it was first placed on the market. It is used mainly as a word processor and sometimes as a spreadsheet. Over the years I have entered programs from Electron User, but unfortunately I am not a programmer, and this is where I need your help.

The program I have found most useful is your Spell-Check from the May 1987 issue, and I use it all the time. For the first time the other day I came across the message "Dictionary Full". Being unsure of what to do I got the magazine out to read the article. At the end of it you say "Programmers may like to extend the routine by making it load and search these special dictionaries if a word is not found".

Please can you tell me what I must do to achieve this facility? – **Michael A. Southam, Exmouth, Devon.**

● The alterations to the program are in fact, quite small. Enter the following lines:

```
DELETE 200,230
550 OSCLI"LOAD DICT1 "+STR$"HIMEM:$
&B00=WS:CALL &C00:IF A1=0 ENDPDC
555 OSCLI"LOAD DICT2 "+STR$"HIMEM:$
&B00=WS:CALL &C00:IF A1=0 ENDPDC
```

Now when you run the program it will first search dictionary DICT1, and if the word is not found, dictionary DICT2. Rename your first (full) dictionary DICT1 and create a new small dictionary with just a couple of words.

Any new words will not be added to the second dictionary because it is overwritten each time a word is searched. To prevent this you would have to save DICT2 after every search.

Easier on the eyes

HAVING typed in the listing on page 64 of the January 1986 issue of Electron User, I was disappointed that the text and graphics for Modes 0 and 1 are difficult to read. Is there any way I can create split screens without the text and graphics being hard to read, as I'm trying to write a motor car racing game similar to Superior Software's Grand Prix Construction Set specifically for the Electron? – **Michael Clarke, Halewood, Liverpool, Merseyside.**

● The problem lies not with the program, but

with your display – we suspect it's a television. Unfortunately, a TV will not display a sharp enough picture for you to read Mode 0 text, but a monitor will. It's a point worth bearing in mind when writing games.

The majority of Electron users use ordinary televisions for the display, so it is best to avoid very small text and graphics.

No news

IN Julia Forester's letterhead designer program in the March 1988 issue of Electron User an example given is headed Electron User Club News. I would be interested to know if there is such an organisation, as this is the only mention that has come to my notice, and I have had the magazine since the first issue. – **A. Edgar, Elgin, Morayshire, Scotland.**

● The club is entirely fictitious, and was merely used to demonstrate the type of letterhead design possible with this excellent utility.

Nicely balanced

WITH reference to the letter which appeared in the September 1988 issue of Electron User which complained about the lack of software pages in the magazine, I feel that I must put my view forward.

I think that the balance is quite acceptable. For a start, I think that most Electron users like to hear about the technical side, as the basic Electron has a lot of potential which needs to be filled by such wonderful products from Pres and Slogger. Software in my opinion cannot be stretched to the same proportions as hardware.

Also, I think that we receive far too much coverage of computer games anyway from other publications, some of which are based entirely on games. No other magazine gives the quality of technical support that Electron User and The Micro User give. Does your correspondent also realise that many of the type-ins featured in Electron User are games, and many of an extremely high quality?

With reference to his statistics – he does use quite different terms. On the one hand are very

specific software reviews and on the other are all-encompassing hardware and technical articles. There are 20 pages to do with software including adverts, type-ins for games and so on, and I fail to see where he finds 20 pages of hardware and technical articles.

If we talk about reviews only, then there are three pages of software reviews and just one page of hardware reviews. It depends on how you quote your statistics. The balance in your magazine is just right in these fields, so please don't change it as I am sure lots of people, including myself, find your magazine great the way it is.

May I thank John Geraghty for his excellent Listif utility in the September 1988 issue. I used the facility at school on another version of BBC Basic and have yearned for it ever since on the Electron. I am now never without it, as it is a brilliant piece of programming. Just one point though – the instructions to merge in a program should be:

```
OSCLI"LOAD X"+STR$(TOP-2)
```

Keep up the excellent work. – **Ken Raynor, Folkstone, Kent.**

Underlining the point

IN reply to the letter from S.E. Stevenson in your October 1988 issue of Electron User. I have a Star LC-10 printer on my Electron and Rombox Plus and find it to be a superb printer. The command for underlining is VDU 1,27,1,45,1,49 and to stop it VDU 1,27,1,45,1,48.

A short program to demonstrate this is:

```
10 MODE 6
20 VDU 2
30 VDU 1,27,1,45,1,49
40 PRINT "Electron User"
50 VDU 3
```

I hope this is of use. – **David Stanford, Hinckley, Leics.**

Program for personal logos

WE are sure there are hundreds of club secretaries who would like to be able to reproduce their club logos on a printer, enabling them to make their own headed notepaper. Is there anyone who could help us with ours?

We would like to know how to write a program which would record the time, race number, competitor's name, team, and finishing positions

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◀ From Page 39

for 400 runners. Can anyone help us? – David Hatch, Bittaford, Ivybridge, South Devon.

● The letterhead designer program in the March 1988 issue of *Electron User* should help you with your first problem. You require a database for the second. Mini Office is a very simple one which would be fine for small numbers of competitors. If you have a disc system take a look at Slogger's Starstore II. This uses the disc rather than the memory to store its data, so can handle much more information.

Best result from Brother

PLEASE can you help me, as I have a problem with my Brother HR5 Printer? I have read the manual which accompanied the printer, but none of the commands or programs work. What I would like to know is how can I print listings and letters?

I like the sound of having an *Electron*-owning pen friend and would like my name and address printed if possible. – Peter Walker, 173 Kingston Crescent, Chatham, Kent, ME5 8YZ.

● Unfortunately, the Brother manual was not written specifically for the *Electron*, so the Basic programs aren't written in BBC Basic and won't work. To list a program press Control+B to switch on the printer and type LIST. When it has finished press Control+C to switch it off. You are best using a word processor like View for producing letters. A simple PRINT command will print one out.

Management problem

I WAS delighted to see Rom Manager among the 10 Liners in the October 1988 issue of *Electron User* as I have been experiencing some problems loading games while some roms have been installed in my Rombox Plus. However, I still use the tape filing system, so would be pleased if you could publish a way we could all use temporarily disabling roms – Rom Manager is for disc users only.

According to the instructions with one of the roms I use, they can be disabled on the BBC Micro by typing:

```
?(673+n)=0
```

where *n* is the rom number, but this does not work on the *Electron*. Is there something similar that will? – R. Miles, Risley, Warrington.

● There's no reason why Rom Manager should not work with tape-based *Electrons*. The BBC Micro's rom table starts one byte higher in memory than the *Electron*'s so use:

```
?(672+n)=0
```

This won't work with all roms however, as there is also an extended vector table at &DF0. For

All programs printed in this issue are exact reproductions of listings taken from running programs which have been thoroughly tested.

However on the very rare occasions that mistakes may occur corrections will be published as a matter of urgency. Should you encounter error messages when you type in a program they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the mail pages.

difficult roms try also poking the byte here. For instance, the ADFS is easily disabled with:

```
?80F4=&9C
```

Renumber bug and lost ram

WHEN I type in a program, such as:

```
10 REM Paul's
20 REM Useless
30 REM Program
```

and then type:

```
RENUMBER 10000
```

and press Break followed by:

```
OLD
LIST
```

I get:

```
16 REM Paul's
10016 REM Useless
10020 REM Program
```

Is this a bug in all Basic roms, or is there something wrong with my computer? I am concerned that one of your software reviewers may review a piece of software with the Turbo-Driver on, but forget to mention it in the review.

My second query is about disc drives. Do discs designed for the original Acorn Plus 3, work on Pres' Advanced Plus 3? I am asking this because I am thinking of buying the Advanced Plus 3 and Plus 3 games disc for it. I gather that I will lose some ram, is this a problem and how can it be solved?

Finally, I am having a big problem with *Psychastria*. I can easily do the land part, but just cannot destroy the sixth pod on the sea base. Can anyone give me some tips? – Paul Gilkerson, Higher Crompton, Plymouth.

● There's nothing wrong with your *Electron*, and the RENUMBER bug is an undocumented feature of BBC Basic.

Rest assured that all games are tested both by

the reviewer and in the *Electron User* offices on both standard and Turbo *Electrons*. Where relevant we always point out whether a Turbo makes any difference, and if it isn't specifically mentioned you can assume that a Turbo isn't required and that the game is fast enough without it.

The discs used with the Plus 3 are exactly the same as those used with Pres' AP3. The latest version of Pres' ADFS fixes the one or two bugs in the original Acorn version, so it is actually better.

You will lose some ram with both systems, but this can be regained by either upgrading to Pres' E00 ADFS, or by relocating the program you want to run down to &E00 with a routine like:

```
*KEYB *T.1:MOX=PAGE-8E00:FOR IX=PAGE
TO TOP STEP4:!(IX-0X)=!IX:NEXT:MPA
GE=&E00:MOLD:M
```

Load your program and then press f0 to relocate it.

All is not lost

I HAVE been reading the article in the April 1988 issue of *Electron User* by Roland Waddilove – Disc Filing System Part VII. "Make a call to the lost and found department".

I have entered and run Program I with complete success, but became unstuck on Program II, this being due to the fact that lines 90,100 and 110 have all been missed out in your print-out. I have spent a lot of time looking through the issues up to date to see if any correction has ever been made, but it would seem that is not so.

Since Program I is of little use without Program II, I would be grateful if you would print these missing three lines. I thank you in advance for your assistance in this matter. – A. C. Dabell, Sandiacre, Nottingham.

● Roland forgot to renumber his program before listing it for the magazine, and in fact, lines 90,100, and 110 don't exist. You must have made a small typing error somewhere in the program. Please check it carefully.

Mini micro user

I AM six years old and have an Acorn *Electron*. Please could you print my letter in your magazine to show that little people also use the *Electron*? It is a good computer. – Joel Gwynne, Gainsborough, Lincs.

Original compilation

THANKS for a great magazine, and your tremendous support for our humble little *Electron*. Can anyone tell me what the difference is between original versions of games and the compilation ones? I'm just about to buy *Play It Again Sam I, II and III* and found that your cheats for the original version of *Codename: Droid* just don't work – and many others too. Why?

I hope the compilation games are as good as

the originals as I can't afford them new. — David Lloyd, Broadstone, Dorset.

● The games should be exactly the same from a player's point of view, but the programmer can relocate his code and store the program variables in a different section of memory. This may mean that a cheat works fine with one version of the game, but for another it is poking the extra lives into entirely the wrong area of memory.

Timely tip

I HAVE been told by friends that there is a clock fitted inside the Electron. If this is the case, are you able to tell me how to gain access to it? — J. Newton, Toned, Pontypridd, Mid Glamorgan.

● Yes, there is a clock inside the Electron, and it starts counting up in hundredths of a second from when you switch on. Here is a short program to zero the clock and print the time in seconds within a never-ending loop:

```
10 MODE 6
20 TIME=0
30 REPEAT
40 PRINT TAB(0,5) "Time=";TIME/100
50 UNTIL FALSE
```

Stardrifter cheat wanted

COULD you please print a cheat for the Electron and BBC Micro game Stardrifter by Firebird? — Peter Woodroffe, Henley-on-Thames, Oxon.

● Can anyone come up with a cheat for Peter?

Lack of communication

HAVING recently bought a Panasonic KX-P1081 printer, I eagerly sought through my back issues of your magazine for anything I could find on the subject. Taking priority was Julia Forester's printer series in the January to March 1988 issues, and having digested this, I set out to do some actual printing. Imagine my horror on finding that all my text, entered from View, was being printed on the same line.

Taking the advice of a friend with a similar machine, I inserted the command *FX6 before doing any printing, and found this did the trick. The strange thing is that nowhere have I seen this problem tackled, or this solution given. It may be that this is a tip worth publishing for the enlightenment of new users.

Thank you for a consistently interesting and informative magazine. — Dennis Hatfield, Hull.

● This is not a fault or bug in either the printer or your Electron. Some computers send a paper feed signal to the printer at the end of each line, but some don't. In order for the printer to be able to cope with both types of micro it can either look for this signal and then move the paper on, or automatically wind the paper on at the end of each line regardless. Your printer is expecting

your Electron to tell it when to wind the paper on, but your Electron is expecting the printer to automatically wind it on — a lack of communication occurs and the result is that neither of them winds the paper on.

One solution is to make the Electron tell the printer to wind on the paper with *FX6, and the other is to make the printer automatically paper feed by flicking DIP switch three inside the printer to the opposite position. Note that if you do both the printer will perform a double paper feed — one because it is told to by the Electron, and the other because it has been set to do it automatically as well.

Caps Lock turn on

A WHILE ago a reader was enquiring how to turn the Caps Lock on during a program. Here is one way:

```
?%25A=%20:REM Sets the Caps Lock
?%25A=%30:REM Releases Caps Lock
```

The following one liner will program a function key with a little routine to test your reactions. Use it during a heavy programming session to see if it's time to call it a day, it is also great fun at parties.

```
*KEY1 CLS:F.X=1 TO RND(3000)+1000:N.
:P,TAB(5,RND(20))"Press a key!":T1=0
:IFGET:P,T1./100;"secs"IM
```

Can you help me with a couple of queries please? I have a circuit diagram of the main board in the Electron, as shown in the Advanced User Guide, but where can I obtain a copy of the power supply board diagram?

Also, I have both View and Viewsheet cartridges but only one free slot in the Plus 1. Would it be possible to open the cartridges, unsolder the

chips and mount them in a dual rom cartridge? I have some soldering experience.

Congratulations on the new magazine format: nice to see a slightly more serious approach. How about some articles to make use of all that storage on a Plus 3 disc? A decent database program would be a good start. — John Bloxham, Stratford-upon-Avon, Warwickshire.

● Can any readers help John with a power supply circuit diagram? You could unsolder View and Viewsheet and place them in one cartridge, but a better solution is to upgrade your Electron by adding a battery backed ram cartridge. This will enable you to store two rom images in the ram, but they can be replaced at any time by two new ones stored on disc.

Our new disc series which started last month will cover all aspects of the ADFS and DFS filing systems.

Out of character procedure

I AM having a problem with one of my programs. In it I have defined some characters using the VDU 23 command, but as it continues through the program it prints an error message when it comes to the PROC command. The procedure has been defined at the end of the program. — Geoffrey Willis, Southbourne, Bournemouth, Dorset.

● There is no way that the VDU 23 command can affect a procedure, so the error must be in the procedure itself. Check this carefully.

Repton exposed

HAVING just started reading your fabulous magazine in September, I came across the arguments for and against the advert for Barbarian. I'd just like to say, hasn't any one noticed that Repton isn't wearing much on the back cover advertisement? — Owen Redman, Saxtead, Woodbridge, Suffolk.

The way to the stars

IN response to J. Bank's letter in the October 1988 issue of Electron User, I can recommend Starfinder published by Century Software (a division of Century-Hutchinson Publishers) in 1984. This was written by Heather Couper (text) and Ronald Alpiar (program) and comes with a 120-page manual explaining the basics of astronomy and the equipment required.

It is a very good, if slightly dated and slow, program, ideal for beginners and more experienced users alike. More details can be obtained from Century I'm sure, but I will be willing to give up my copy if need be as I don't use it much now since I sold my telescope to pay for an AP3.

Century Software can be found at 12-13 Greek Street, London, W1V 5LE. — Gordon Moar, Bridgend, Linlithgow, West Lothian.



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ARCADE CORNER

Compiled by MARTIN REED

Spellbinding

In this month's Arcade Corner we feature a map of the first floor of the castle in Superior Software's massive arcade adventure Spellbinder. It has been provided by David Scott of Byker, Newcastle-Upon-Tyne.

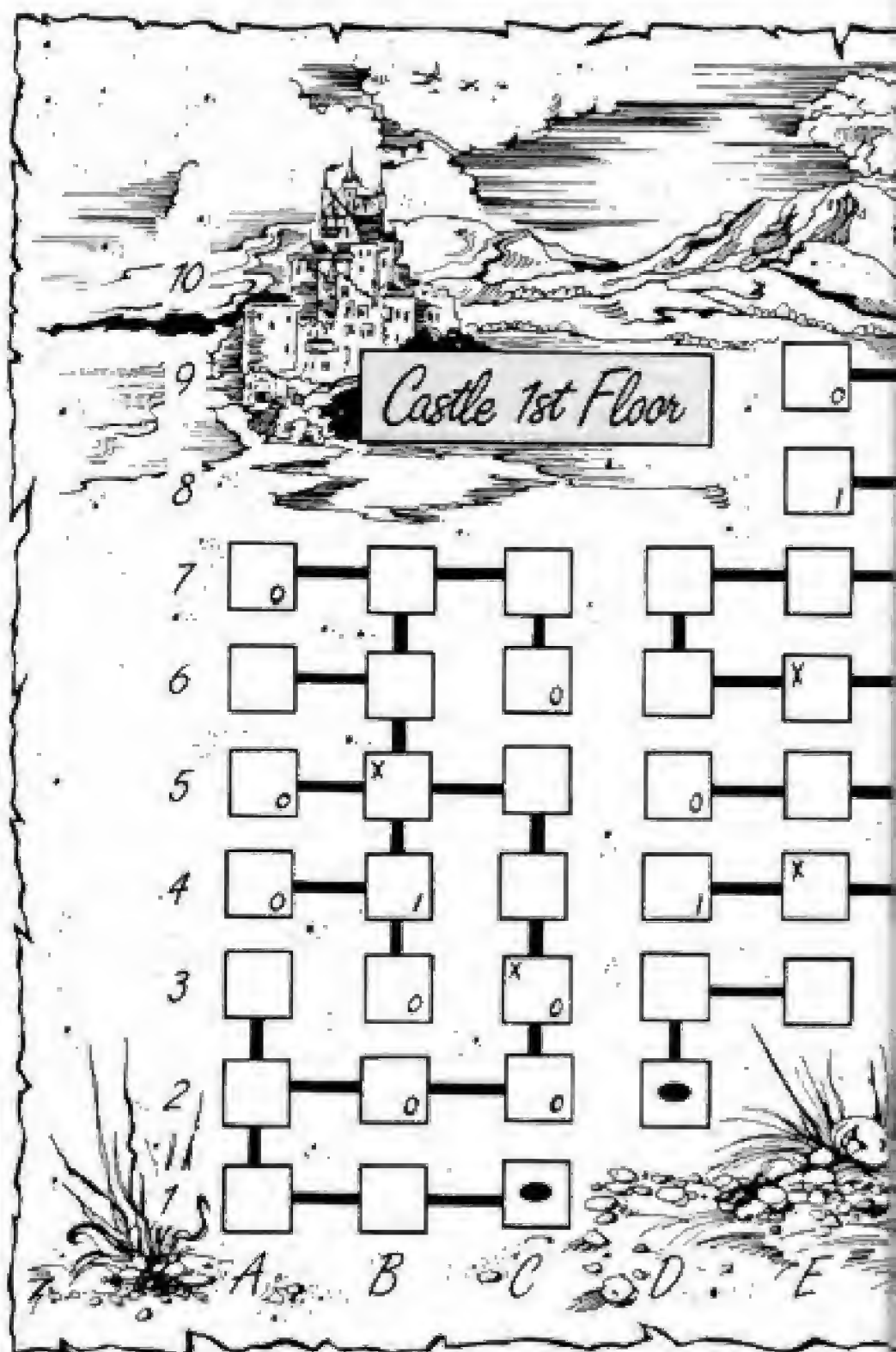
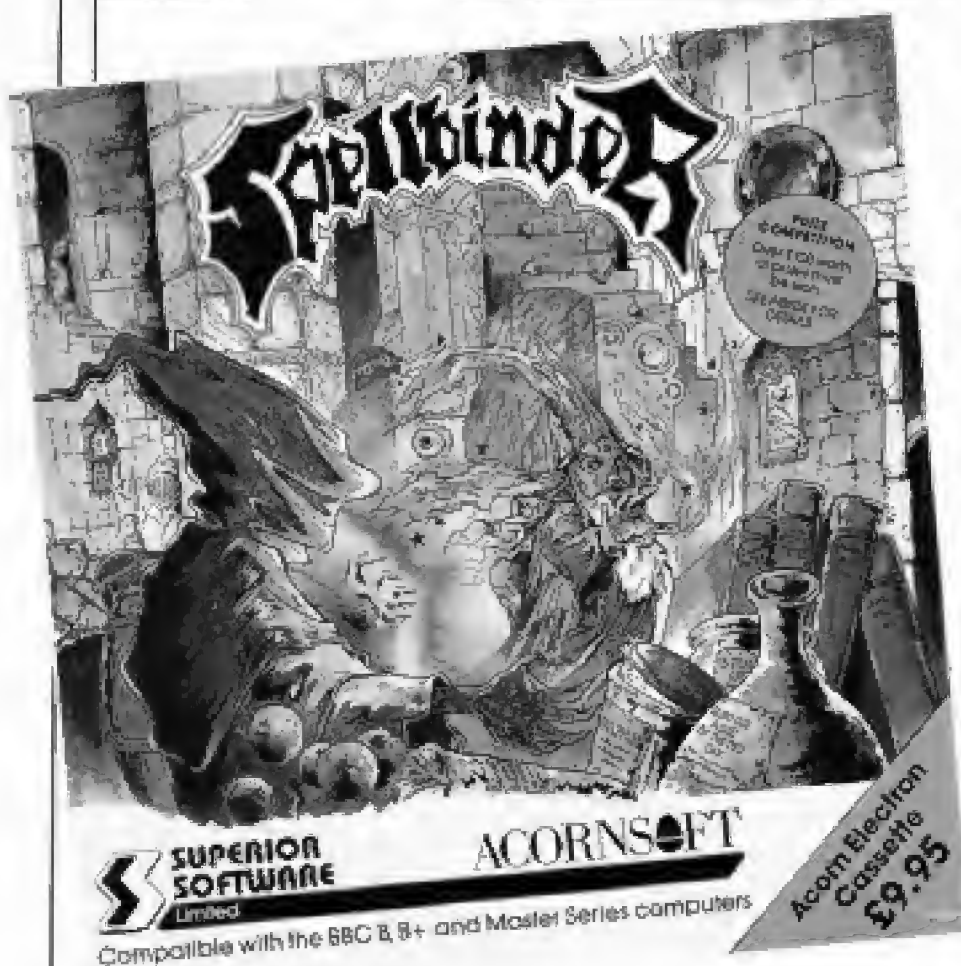
This brilliant game has had many *Electron User* readers stumped for months, so it will be a welcome helping hand on the way to the ultimate goal of solving this puzzling game. Also

provided are the correct moves for the first part of the game.

The Room coordinate shows where you should go to, and the Action part tells you what you should do when you get there. For instance, you start at H1 on the map, head for H3 and when you get there search the box. Now make your way to C3 and search the box there, and so on.

Share your hints, tips, pokes and cheats with fellow *Electron User* arcade addicts – but please ensure they are all your own work. Send them to:

Arcade Corner, *Electron User*,
Adlington Park, Adlington,
Macclesfield, SK10 4NP



SOLUTION

Spell	Use	Ingredients
Heal	Increases strength	B,D
Full heal	Increases strength	B,D,F
Freeze	Slows down other creatures	C,A
Deep freeze	Slows down other creatures	C,A,F
Air shield	Acts as a defence shield	G,A
Wind shield	Acts as a defence shield	G,A,F
Air bubble	Encloses you in pocket of air	E,D
Body bubble	Encloses you in pocket of air	E,D,F
Storm hit	Hits other creatures	A,A,F
Thunder hit	Hits other creatures	I,C,C,F
Sun hit	Hits other creatures	J,A,F,F
Poisoned worms	Kills plant	K,B

Key to spells:	
A	Ashes
B	Sulphur
C	Toad legs
D	Roots
E	Leaves
F	Fleas
G	Wine
H	Mushroom
I	Fruit
J	Pearl
K	Worms

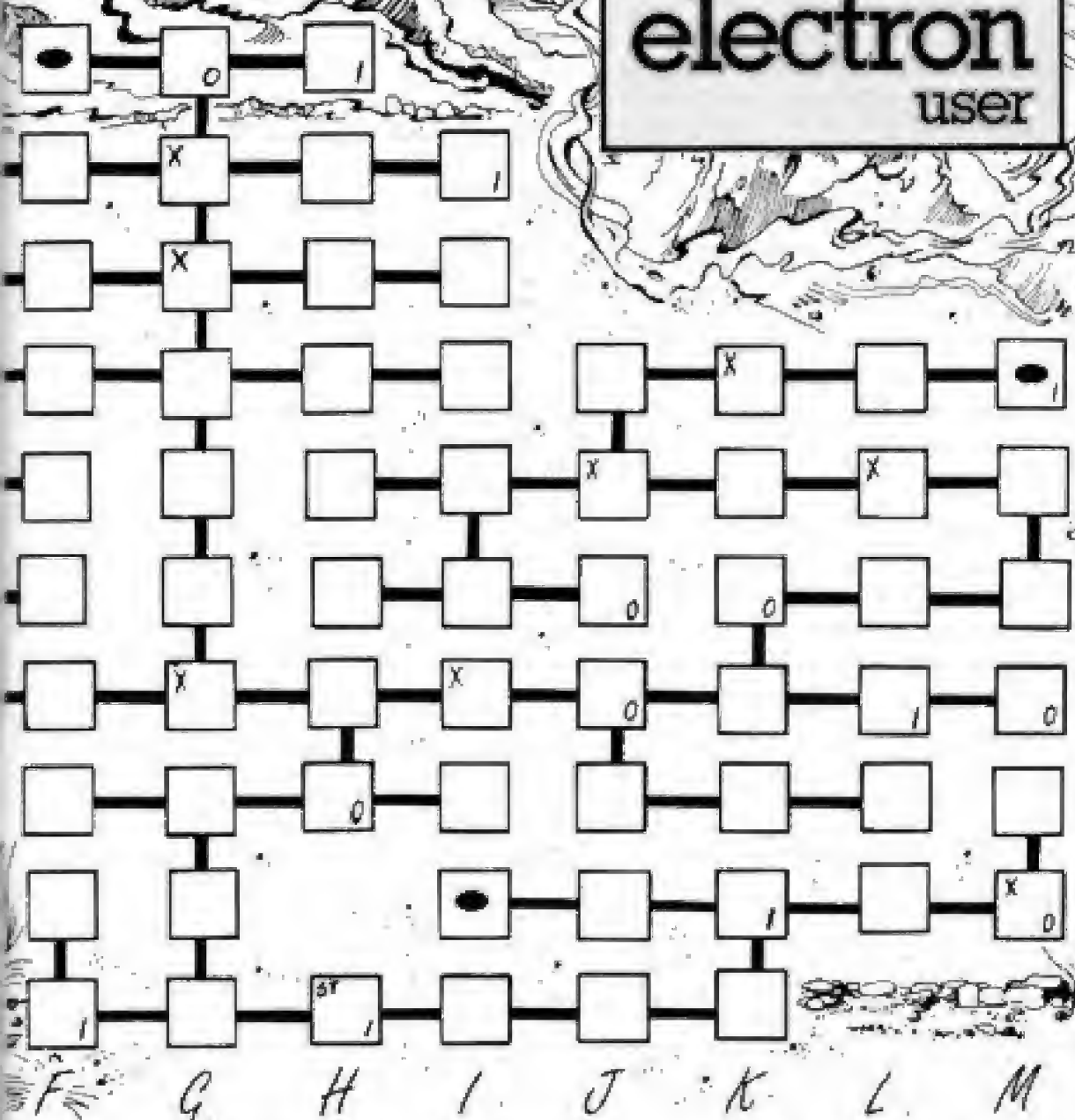
Room	Action
H1	Start
H3	Search box
C3	Search box
C2	Search box
B2	Search table
B3	Search barrel
A4	Search iron man to open door at G8
A4	Search box
A5	Search bed
A7	Search box
C6	Search barrel
M4	Search box
K5	Search box
J5	Search forest at night
H7	Search plant
D5	Search bed
E9	Search box
G10	Touch altar, moves corridor G2 to other side of wall
G10	Use teleport to second floor A2

The moves for the first part of the game

electron
user



Key	
●	Portal/Teleport
/	Information
O	Objects
X	Creatures



◀ From Page 37

```

10 REM SENET
20 REM by Arthur Lindon
30 REM (c) Electron User
40 IF PAGE>8000 GOTO2160
50 REM (c) 1987
60 DIM C$(31),NS(2),G$(2)
70 PROCgraphics
80 MODE1:VDU19,0,3,0;19,2,4,0;
90 VDU23,1,0;0;0;0;+FX11,0
100 RX=0:BX=0
110 PROCprintboard
120 COLOUR130:COLOUR3
130 PRINTTAB(18,27)"ENTER PLAYERS' N
AMES";TAB(18,29)"each max. 11 letters"
140 FOR I=1 TO 2
150 INPUTTAB(18,18+2*I);NS:NS(I)=L
EFT$(NS,11)
160 NEXT
170 PRINTTAB(18,20)SPC21;TAB(18,22)S
PC21;TAB(18,27)SPC21;TAB(18,29)SPC21
180 PX=RND(2)
190 REPEAT
200 PX=3-PX
210 PRINTTAB(18,20)NS(PX)" to throw"
220 PROCthrow
230 PRINTTAB(18,20)SPC21
240 UNTIL TX=1
250 COLOUR131:COLOUR2
260 PRINTTAB(8-.5*LEN NS(PX),2)NS(PX
)
270 COLOUR1:PRINTTAB(33-.5*LEN NS(3-
PX),2)NS(3-PX)
280 IF PX<>2 TX=NS(PX):NS(1)=NS(3-PX
):NS(2)=TX
290 PROCpause
300 COLOUR128:COLOUR2
310 PRINTTAB(33,8)G$(0):CX(10)=0
320 PRINTTAB(33,12)G$(2):CX(11)=2
330 PX=2:PROCgo
340 COLOUR130:COLOUR3
350 PX=1:PRINTTAB(20,21)SPC19;TAB(20
,21)NS(PX)"'s turn"
360 PROCthrow:PROCpause
370 KX=10:REPEAT:KX=KX-1:UNTIL CX(KX
)=1
380 LX=TX*KX
390 PROCmove
400 COLOUR130:COLOUR3
410 PRINTTAB(20,27)"Press 'Z' to p
ass";TAB(22,29)"to next player"
420 REPEAT
430 IF TX=2 OR TX=3 PX=3-PX
440 PROCgo
450 UNTIL RX=5 OR BX=5
460 :
470 VDU20,20,25,37,21:COLOUR131:COLO
UR PX:CLS:VDU26
480 PRINTTAB(30-.5*LEN NS(PX),22)NS(
PX)
490 PRINTTAB(23,24)"IS THE WINNER"
500 VDU23,1,1;0;0;0;+FX12,0
510 END
520 :
530 DEFPROCgo
540 REPEAT
550 COLOUR130:COLOUR3
560 PRINTTAB(20,21)SPC19:PRINTTAB(20
,21)NS(PX)"'s turn"
570 PROCthrow
580 REPEAT
590 FLAG=0
600 PROCchoice
610 IF KX=90 PROCpass
620 IF FLAG=0 IF LX>30 FLAG=1
630 IF FLAG=0 IF CX(KX)<>PX OR CX(LX
)=PX FLAG=1
640 IF FLAG=0 IF LX=30 PROCcheckfini
sh
650 IF FLAG=0 IF LX=27 PROCtrap
660 IF FLAG=0 IF TX>3 PROCblockade
670 IF FLAG=0 IF CX(LX)=3-PX AND (CX

```

```

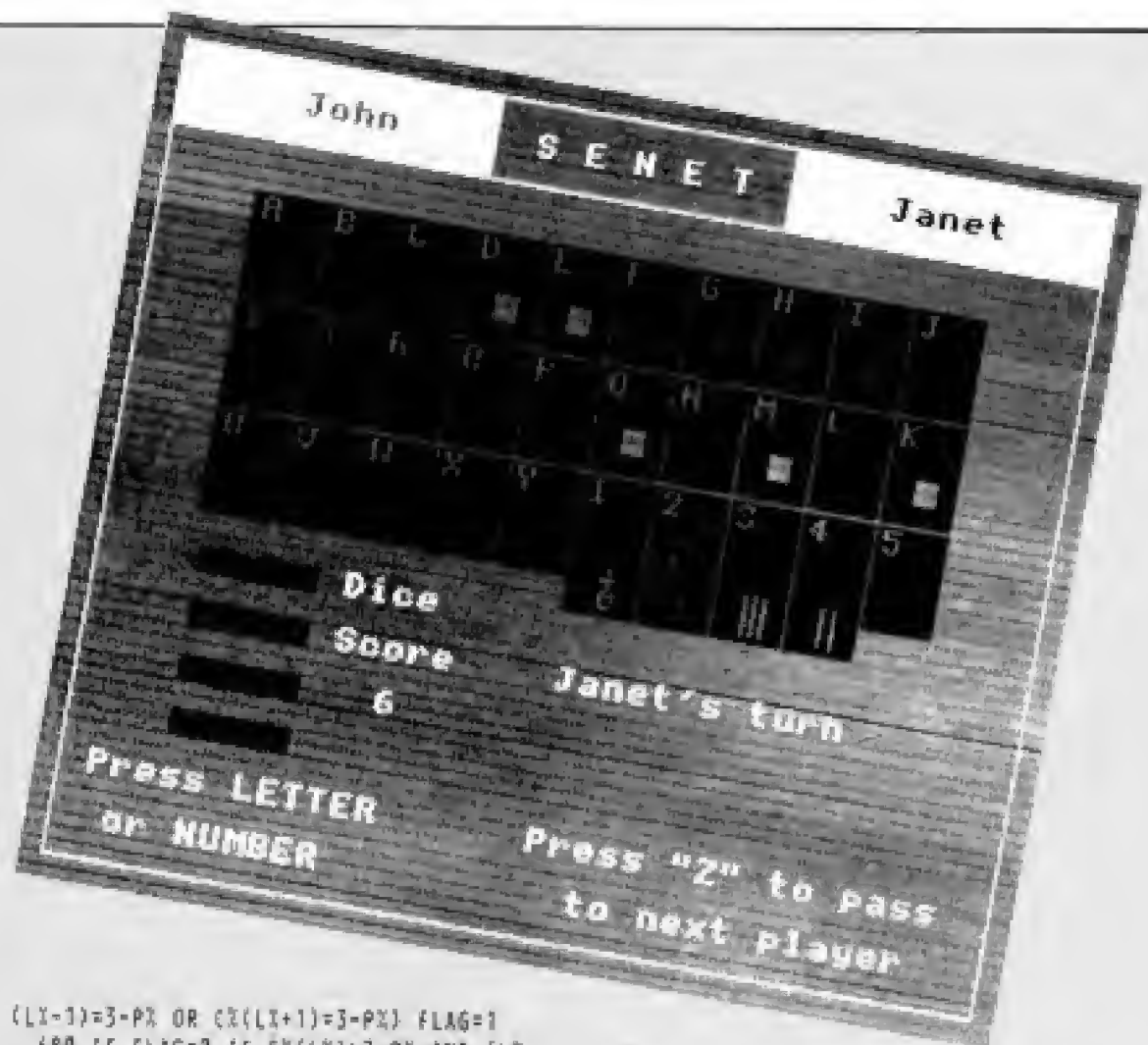
(LX-1)=3-PX OR CX(LX+1)=3-PX) FLAG=1
680 IF FLAG=0 IF CX(LX)=3-PX AND (LX
=26 OR LX=28 OR LX=29) FLAG=1
690 IF KX=0 FLAG=0
700 IF FLAG VDU7
710 UNTIL FLAG=0
720 IF KX PROCmove
730 UNTIL TX=2 OR TX=3
740 ENDPROC
750 :
760 DEFPROCpass
770 IF CX(27-TX)=PX PROCunpass
780 FLAG=1:KX=0:TX=2
790 ENDPROC
800 :
810 DEFPROCunpass
820 KX=27-TX:LX=27
830 IF TX>3 PROCblockade
840 IF FLAG=0 PRINTTAB(20,23)"NAUGHT
Y!":PROCtrap
850 COLOUR130:PRINTTAB(20,23)SPC8
860 ENDPROC
870 :
880 DEFPROCtrap
890 PROCmove
900 VDU7:PROCpause
910 KX=27
920 LX=0:REPEAT:LX=LX+1:UNTIL CX(LX)
=0
930 PROCmove
940 FLAG=1:KX=0:TX=2
950 ENDPROC
960 :
970 DEFPROCpause
980 TIME=0:REPEATUNTILTIME>60
990 ENDPROC
1000 :
1010 DEFPROCblockade
1020 FOR UX=KX+1 TO LX-3
1030 IF CX(UX)=3-PX AND CX(UX+1)=3-PX
AND CX(UX+2)=3-PX FLAG=1
1040 NEXT
1050 ENDPROC
1060 :
1070 DEFPROCcheckfinish
1080 IX=0
1090 REPEAT
1100 IX=IX+1
1110 UNTIL CX(IX)=PX OR IX>20
1120 IF IX>20 PROCtakeoff
1130 FLAG=1
1140 ENDPROC
1150 :
1160 DEFPROCtakeoff

```

```

1170 PROCmove:PROCpause
1180 PRINTTAB(33,16)G$(0):CX(30)=0
1190 COLOUR130:IF PX=1 RX=RX+1:COLOUR
1:PRINTTAB(36,2*RX+5)G$(1)
1200 IF PX=2 BX=BX+1:GCOL0,3:MOVE76,8
68-64*BX:DRAW112,868-64*BX:DRAW112,832
-64*BX:DRAW76,832-64*BX:DRAW76,868-64*
BX
1210 KX=0:IF RX=5 OR BX=5 TX=2
1220 ENDPROC
1230 :
1240 DEFPROCthrow
1250 COLOUR130:COLOUR3
1260 FOR I=1 TO 4
1270 PRINTTAB(5,17+2*I);SPC12
1280 NEXT
1290 PRINTTAB(2,27)"Press <SPACE>";T
AB(3,29)" to throw "
1300 REPEATUNTILGET=32
1310 TX=0
1320 FOR I=1 TO 4
1330 AX=RND(2)-1
1340 TX=TX+AX
1350 IF AX COLOUR131 ELSE COLOUR129
1360 PRINTTAB(5,17+2*I);SPC5
1370 NEXT
1380 IF TX=0 TX=6
1390 COLOUR130:COLOUR3
1400 PRINTTAB(11,19)"dice";TAB(11,21)
"Score";TAB(13,23);TX
1410 ENDPROC
1420 :
1430 DEFPROCchoice
1440 PRINTTAB(2,27)"Press LETTER ";T
AB(3,29)"or NUMBER"
1450 +FX21,0
1460 REPEAT
1470 KX=GET
1480 IF KX<49 OR KX>90 OR KX>53 AND K
X<65 VDU7
1490 UNTIL KX>48 AND KX<54 OR KX>64 A
ND KX<91
1500 IF KX<54 KX=KX-23 ELSE IF KX<90
KX=KX-64
1510 IF KX<>90 LX=KX+TX
1520 ENDPROC
1530 :
1540 DEFPROCmove
1550 IF CX(LX)=3-PX GS=G$(3-PX):CX(KX
)=3-PX ELSE GS=G$(0):CX(KX)=0
1560 CX(LX)=PX
1570 COLOUR128:COLOUR3-PX

```




```

1580 IF KX<11 PRINTTAB(3*KX+3,8);GS
1590 IF KX>10 AND KX<21 PRINTTAB(66-3
*KX,12);GS
1600 IF KX>20 PRINTTAB(3*KX-57,16);GS
1610 COLOURP1
1620 IF LX<11 PRINTTAB(3*LX+3,8);GS(P
X)
1630 IF LX>10 AND LX<21 PRINTTAB(66-3
*LX,12);GS(PX)
1640 IF LX>20 PRINTTAB(3*LX-57,16);GS
(PX)
1650 ENDPROC
1660 :
1670 DEFPROCprintboard
1680 COLOUR130:CLS
1690 COLOUR131:VDU28,1,3,13,1:CLS
1700 VDU28,26,3,38,1:CLS:VDU26
1710 COLOUR130:COLOUR3
1720 MOVE496,956:VDU5:PRINT'S E N E T
:VDU4
1730 GCOL0,3
1740 MOVE28,992:DRAW1248,992:DRAW1248
,28:DRAW28,28:DRAW28,992
1750 MOVE444,896:DRAW828,896
1760 GCOL0,0
1770 MOVE152,832:MOVE1108,832:PLOT8
5,152,456:PLOT85,1108,456
1780 MOVE636,452:MOVE1012,452:PLOT8
5,636,416:PLOT85,1012,416
1790 GCOL0,2
1800 FOR IX=248 TO 1016 STEP 96
1810 MOVE IX,832:DRAW IX,416
1820 NEXT
1830 MOVE152,708:DRAW1108,708
1840 MOVE152,580:DRAW1108,580
1850 COLOUR128:COLOUR2
1860 FOR IX=1 TO 10

```



```

1870 PRINTTAB(3*IX+2,6);CHRS(IX+64)
1880 PRINTTAB(3*IX+2,10);CHRS(85-IX)
1890 PRINTTAB(3*IX+2,14);CHRS(IX+84+4
*IX+5))
1900 NEXT
1910 VDU31,21,17,226,10,8,227
1920 VDU31,27,17,230,10,8,231
1930 VDU31,30,17,232,10,8,233
1940 COLOUR1:VDU31,24,17,228,10,8,229
1950 FOR IX=1 TO 9 STEP 2

```

```

1960 COLOUR1:PRINTTAB(3*IX+3,8);GS(1)
:CX(IX)=1
1970 COLOUR2:PRINTTAB(3*IX+6,8);GS(2)
:CX(IX+1)=2
1980 NEXT
1990 ENDPROC
2000 :
2010 DEFPROCgraphics
2020 VDU23,224,60,126,255,255,255,255
,126,60
2030 VDU23,225,255,255,255,255,255,25
5,255,255
2040 VDU23,226,0,0,24,24,126,126,24,2
4
2050 VDU23,227,60,126,102,102,126,60,
0,0
2060 VDU23,228,0,0,195,102,102,60,60,
24
2070 VDU23,229,24,60,60,102,102,195,0
,0
2080 VDU23,230,0,0,219,219,219,219,21
9,219
2090 VDU23,231,219,219,219,219,219,21
9,0,0
2100 VDU23,232,0,0,102,102,102,102,10
2,102
2110 VDU23,233,102,102,102,102,102,10
2,0,0
2120 GS(0)=CHRS32
2130 GS(1)=CHRS224
2140 GS(2)=CHRS225
2150 ENDPROC
2160 *I.
2170 *KEY0 DI=PAGE-&E00:FORIX=PAGE TO
TDP STEP4:!(IX-DX)=!IX:NEXT:PAGE=&E00
MOEDMRUNK
2180 *FX138,0,128

```

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```

:STX ycoord
410 LDY #34:STY oldy
420
430 .main
440 SEI:JSR drawmap:CLI
450 JSR BFFED:BES esc
460 JSR move
470 JSR check
480 JMP main
490 .esc
500 RTS
510
520 .move
530 CMP #ASC'A':BNE down
540 LDA ycoord:BEQ end_move
550 DEC ycoord
560 LDA man:BEQ climb2
570 .climb1
580 LDX #0:RTS
590 .down
600 CMP #ASC'↓':BNE left
610 LDA ycoord:CMP #13:BEQ end_move
620 INC ycoord
630 LDA man:BNE climb1
640 .climb2
650 LDX #1:RTS
660 .left
670 CMP #ASC'←':BNE right
680 LDA xcoord:BEQ end_move
690 DEC xcoord
700 LDA man:CMP #2:BEQ left2
710 LDX #2:RTS
720 .left2
730 LDX #3:RTS
740 .right
750 CMP #ASC'→':BNE end_move
760 LDA xcoord:CMP #13:BEQ end_move
770 INC xcoord
780 LDA man:CMP #4:BEQ right2
790 LDX #4:RTS
800 .right2
810 LDX #5
820 .end_move
830 RTS
840
850 .check
860 STX man
870 LDA ycoord
880 ASL A:ASL A:ASL A:ASL A ly*16
890 ADC #34
900 ADC xcoord
910 STA index
920 LDY index
930 LDA scr,Y:BEQ santa_direction
940 CMP #5:BEQ cracker
950 CMP #6:BEQ present
960 CMP #7:BEQ present
970 CMP #8:BEQ pudding1
980 CMP #8f:BEQ pudding1
990 CMP #810:BEQ pudding2
1000 LDA yone:STA ycoord
1010 LDA xone:STA xcoord
1020 RTS
1030
1040 .present
1050 LDA #7:JSR BFFEE \bleep
1060 JSR score
1070
1080 .santa_direction
1090 STY tempy
1100 LDA man
1110 ADC #9
1120 STA scr,Y
1130 LDY oldy
1140 LDA #0
1150 STA scr,Y
1160 LDY tempy
1170 STY oldy
1180 JMP drawmap

```

```

1190
1200
1210 .pudding1
1220 LDA #810:STA scr,Y
1230 SEC:TYA:SBC #16:TAY \check space
1240 LDAscr,Y:BEQ pudding2 \above is
free
1250 LDA yone:STA ycoord
1260 LDA xone:STA xcoord
1270 JMP drawmap
1280
1290 .pudding2
1300 LDA #8f:STA scr,Y
1310 SEC:TYA:SBC #16:TAY
1320 LDA scr,Y:BEQ pudding1
1330 LDA yone:STA ycoord
1340 LDA xone:STA xcoord
1350 JMP drawmap
1360
1370 .cracker
1380 LDA #0:STA scr,Y
1390 LDA #0:STA ycoord
1400 LDA #0:STA xcoord
1410 LDA oldy:TAY:LDA #0:STA scr,Y
1420 LDA #34:TAY:LDA #9:STA scr,Y
1430 STY oldy

```

CONTROLS

A Up
 Z Down
 < Left
 > Right

```

1440 JMP drawmap
1450
1460 .score
1470 INC sc
1480 LDX #2
1490 .score_loop
1500 INC digits,X
1510 LDA digits,X
1520 CMP #ASC'0'+10
1530 BNE sc_ok
1540 LDA #ASC'0'
1550 STA digits,X
1560 DEX
1570 BPL score_loop
1580 .sc_ok
1590 LDX #0
1600 .score_loop2
1610 LDA digits-3,X
1620 JSR dsurch
1630 INX
1640 CPX #7
1650 BNE score_loop2
1660 LDA man:DEC man
1670 RTS
1680

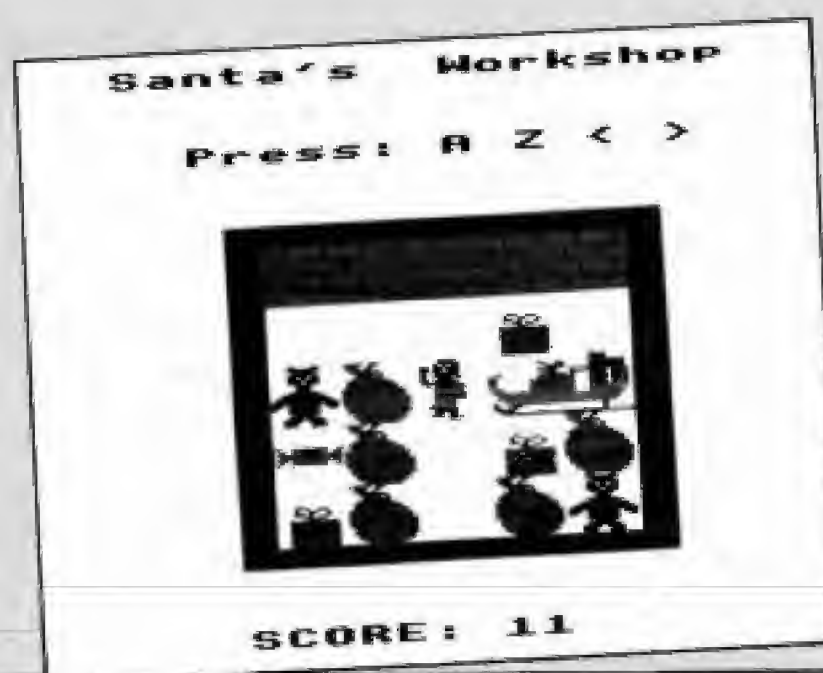
```

```

1690 EQUW 31:EQUW 10:EQUW 29
1700 .digits EQUW -00'
1710
1720 .drawmap
1730 LDA ycoord
1740 ASL A:ASL A:ASL A:ASL A ly*16
1750 ADC xcoord
1760 STA index \top left corner of ma
P
1770 LDA pos:STA addr:LDA pos+1:STA a
addr+1
1780 LDY #5:STY ycount
1790 .yloop
1800 LDA addr:STA temp:LDA addr+1:STA
temp+1
1810 LDA index:STA tindex \save index
1820 LDA #5:STA xcount
1830 .xloop
1840 LDA addr:STA new:LDA addr+1:STA
new+1
1850 LDY index
1860 INC index
1870 LDA scr,Y \get map byte
1880 JSR print
1890 LDA addr:ADC #4+8:STA addr
1900 LDA addr+1:ADC #0:STA addr+1
1910 DEC xcount:BNE xloop
1920 LDA temp:ADC #(3+8140)MOD256:STA
addr
1930 LDA temp+1:ADC #(3+8140)DIV256:S
TA addr+1
1940 LDA tindex:ADC #16:STA index
1950 DEC ycount:BNE yloop
1960 LDA ycoord:STA yone
1970 LDA xcoord:STA xone
1980 CLI
1990 LDA #50:CMP sc:BNE end_print
2000 PLA:PLA:RTS
2010 .end_print
2020 RTS
2030
2040
2050 .mult
2060 EQUW 0
2070 EQUW 1*96
2080 EQUW 2*96
2090 EQUW 3*96
2100 EQUW 4*96
2110 EQUW 5*96
2120 EQUW 6*96
2130 EQUW 7*96
2140 EQUW 8*96
2150 EQUW 9*96
2160 EQUW 10*96
2170 EQUW 11*96
2180 EQUW 12*96
2190 EQUW 13*96
2200 EQUW 14*96

```

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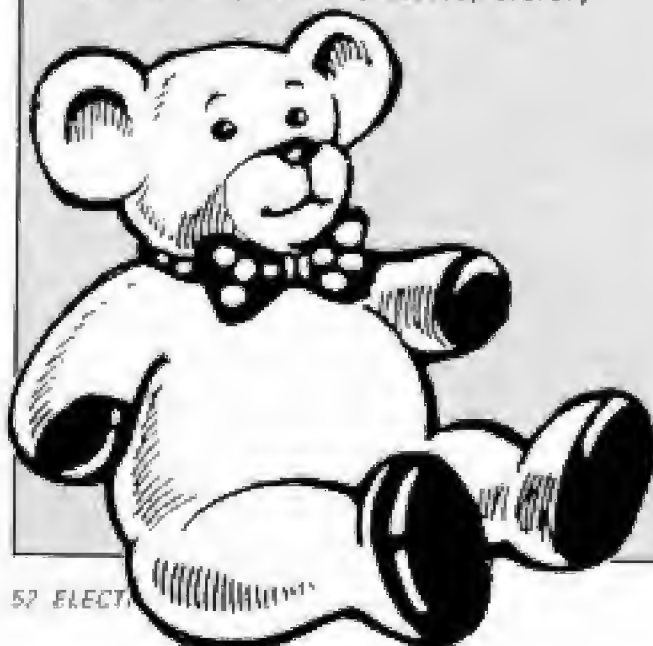


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```

2210 EQUW 15*96
2220 EQUW 16*96
2230
2240 .print
2250 ASL A:YAY \sprite+2
2260 LDA mult,Y
2270 ABC #sprites MOD256 \set data
2280 STA ploop+1
2290 LDA mult+1,Y
2300 ADC #sprites DIV256
2310 STA ploop+2
2320 LDY #3
2330 .ploop1
2340 LDY #31
2350 .ploop
2360 LDA #3000,Y:STA (new),Y
2370 DEY:BPL ploop
2380 CLC
2390 LDA new:ABC #840:STA new
2400 LDA new+1:ADC #81:STA new+1
2410 LDA ploop+1:ABC #32:STA ploop+1
2420 LDA ploop+2:ADC #0:STA ploop+2
2430 .p1
2440 DEY:BNE ploop1
2450 RTS
2460
2470 OPT FNsprdata
2480
2490 .sprites
2500 EQUW STRINGS(96,CHRS0)
2510 OPT FNsprdata
2520
2530 ]
2540 NEXT
2550 ENDPROC
2560
2570 DEF FNsprdata
2580 RESTORE 2650
2590 FOR IX=0 TO 16*4*24-1 STEP 4
2600 READ a$
2610 [ OPT pass
2620 EQUW EVAL(8+a$)
2630 ]
2640 NEXT
2650 =pass
2660 REM Brick
2670 DATA F0F0F0F,2D2Df00F,4B4B4B4B,F
0FF04B,F0F0F0F,2D2Df00F,4B4B4B4B,F0FF0
4B,F02D2D2D,F0F0F0F,F00F0F0F,4B4B4B4B,
F02D2D2D,F0F0F0F,F00F0F0F,4B4B4B4B,2D2
Df00F,F02D2D2D,F0FF04B,F00F0F0F,2D2Df0
0F,F02D2D2D,F0FF04B,F00F0F0F
2680 REM Sleigh
2690 DATA 0,20000000,0,0,11000000,1100
00,10000000,42E256A9,C0C0C06,7070E0C,0
,F0000000,52211001,F255225,5AA55AA5,FA5
5AA5,44010303,11336644,F0F0F0F,FF88CC6
6,F0F0F0F,FF000000,F0F0F0F
2700 DATA FF000000
2710 REM Sleigh
2720 DATA 0,3030008,13031302,1F0F1303
,7C8C4C00,508C7C0C,C0000000,8EC0C0C,4
A864A82,4A864A86,12121303,3031212,0101
509D,F0FC3D1,8E8E8E8E,C0E0E0E,F0F0F0F,

```



```

FF000000,F0F0F0F,FF000000,F0F0F0F,FF44
4444,8080C
2730 DATA FF000000
2740 REM Sack
2750 DATA 2152255A,52211011,FF44223B,
5AA55AA4,0,4A840000,0,0,5AA55225,5AA55
AAS,5AA55AAS,5AA55AAS,5AA55AAS,5AA55AA
5,48800000,4AA4A84,522552A5,11221,5AA
55AAS,5AA55AAS,5AA55AAS,5AA55AAS,4AA44
AA4
2760 DATA 804884
2770 REM Cracker
2780 DATA 0,0,0,0,0,0,0,0,70F060C,C06
0F,1E3C3C3C,F0F0F,87C3C3C3,F0F0F,E0F06
03,3060F,0,0,0,0,0,0
2790 DATA 0
2800 REM Teddy
2810 DATA 0,0,F070F0C0,70E0E000,E0C0E
060,C0E0E060,0,0,10000000,E0C07030,F0F
03330,F0F0F0F0,F0E08880,E0F0F0F0,0,E6E
6C080,CC,11F11100,70F0F0F0,CCCC8F0,C0
E0E0E0,7777F3E0,66
2820 DATA 0
2830 REM Present
2840 DATA 0,0,0,40000000,0,0,0,0,10
1100,300090A0,9F4F2F10,60109060,2F9F4
F80,0,4C0C8C00,11010111,1110101,2F9F4F
2F,4F2F9F4F,4F2F9F4F,9F4F2F9F,8C4C0C8C
2850 DATA C8C4C0C
2860 REM Pudding
2870 DATA 0,77331100,77330000,FEFFFDf
f,E0C00000,F0FFFFFf,0,C4CC8800,60F777
7,40202F7A,FFFFF7F,4FE55F7F,FEFDFFFF,
4B2F3E0F,FFFF0A66,4F6D4FCF,16250F0F,10
3,870F4B0F,71E400F,40F0F0F,C0E0F0F,C0
E0E0E
2880 DATA 8
2890 REM Santa Climb1
2900 DATA 60000000,6060666,F8A87707,7
7F0F808,8C8C0C08,448C8C8C,0,0,30706,0,
2F7F7F7F,FFFF0F0F,E0E0C08,68E0E0E,0,0,
11010000,100000,C0F0F0F0,100000F3,8080
808,C0808080,0,0
2910 REM Santa Climb2
2920 DATA 0,0,F8A87707,77F0F808,8C8C0
C08,470F8F0F,0,0,3030100,30330303,2F7F
7F7F,FFFF0F0F,80F0F08,8880808,0,0,0,100
00000,1F0F0F0F,C00000FE,CC0C0808,C0808
0,0,0
2930 REM Santa Left1
2940 DATA 0,0,F1317367,CFEF7670,E0C0C
08,2A22060E,0,0,0,101010,7030580,78808
8E,80808,8880808,0,0,0,100000,7070707,
00E06077,CC0C0808,80C0C080,0,0
2950 REM Santa Left2
2960 DATA 0,0,F1317367,CFEF7670,E0C0C
08,2A22060E,0,0,0,605078F,71270705,C
0C0808,800080C,0,0,0,101000,C0F0725,F
0E06073,0080808,C0C08080,0,0
2970 REM Xmas Right1
2980 DATA 1000000,11110101,3E3E3F17,7
13393C,C0008088,CC0C8800,0,0,0,0,0E07
07,3613070E,80808C0,80008080,0,0,0,0,7
070716,E0C05077,C0808080,C0E04080,0,0
2990 REM Xmas Right2
3000 DATA 1000000,11110101,3E3E3F17,7
13393C,C0008088,CC0C8800,0,0,0,0,30706
06,7770605,80008CC,8646C6C,0,0,0,0,C0F
0707,60000073,8080808,C0E08080,0,0
3010 REM BALL2
3020 DATA 1010000,2C243412,603C0700,5
5557700,10B0E00,55557700,8000000,40404
0C,48484008,68804808,7777,0,7777,0,202
0206,2020202,103163C,0,68000000,7342C,
1000000,C8603,80C0602,0
3030 REM BALL1
3040 DATA 0,16120100,34030000,802860,
420C0000,103,0,40C0800,48682406,480808
48,0,77000000,0,77000000,1030206,30101
01,16340C08,103,F7555577,71CC080,77555
577,CC26101,C060202,8
3050
3060 DEF FNsprdata

```

```

3070 RESTORE 3180
3080 scr=PX
3090 FOR YX=1 TO 16
3100 READ a$
3110 FOR XX=1 TO 16
3120 [ OPT pass
3130 EQUW EVAL(LEFTS(a$,1))
3140 ]
3150 a$=MID$(a$,2)
3160 NEXT
3170 NEXT
3180 =pass
3190
3200 REM Screen 1
3210 DATA 111111111111111111
3220 DATA 111111111111111111
3230 DATA 119060007000700711
3240 DATA 110476402300444011
3250 DATA 117485407408666011
3260 DATA 110477404604664711
3270 DATA 110607406404664011
3280 DATA 110234404604444011
3290 DATA 110070074704007011
3300 DATA 110444087404744811
3310 DATA 110707000686047711
3320 DATA 118444044444044011
3330 DATA 110070007000004611
3340 DATA 110786023444604011
3350 DATA 110468057047805011
3360 DATA 117004564760467811
3370 DATA 111111111111111111
3380 DATA 111111111111111111
3390 DEFPROCmusic
3400 RESTORE 3470
3410 REPEAT
3420 READXX,YX
3430 IFXX=25560F03460
3440 SOUND1,-12,XX,YX
3450 SOUND1,0,0,1
3460 UNTILXX=255
3470 ENDPROC
3480 DATA48,5,48,5,48,10,48,5,48,5,48
,10,48,5,60,5,32,5,40,5,48,10,52,5,52,
5,52,5,52,5,52,5,48,5,48,5,48,5,48,5,4
0,5,40,5,48,5,40,10,60,10,48,5,48,5,48
,10,48,5,48,5,48,10,48,5,60,5,32,5,40,
5,48,10,52,5,52,5,52,5,52,5,52,5,48,5,
48,5,48,5
3490 DATA60,5,60,5,52,5,40,5,32,10,25
5,1

```



PLAY IT AGAIN SAM

5

**NEW
ELECTRON
RELEASE**



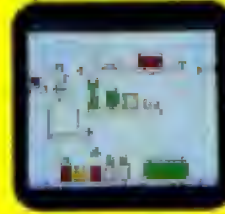
IMOGEN
Micro Power's Recent Hit
The superbly animated adventure game, playing the part of Imogen the wizard with powers of metamorphosis, was highly praised when recently released for the BBC Micro. It is now also available for the first time for the Electron, having been specially prepared for this adaptation. Both versions combine addictive and challenging game-play with highly detailed graphics.



**A
Superior
Hit**



ELIXIR
Superior's Humorous
Strategy Game
Help poor Cyril to return to his normal size by finding the elixir. Keep ahead of the baddies, master, dodge the acid, and watch out for the "Boulevardeur" creatures. "The logical puzzles are well thought out" and give players something to get their teeth into." — Acorn User



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BUG BLASTER
A Classic Hit from Alligata
The best implementation of the "Centipede" game (even better than Superior's own version). Fast-moving with very detailed graphics. Features include mushrooms, spiders and a multiroom-positioning scorpion known as Brian. Nerve-fraying excitement — the better you get the faster the action.



**SUPERIOR
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FORTRESS
Pacal & Acorn's No. 1 Hit
You fly a delta-winged fighter over rocket launchers, gun turrets and force fields on a 3D diagonally scrolling screen. "A new dimension in arcade games. The game is moving, the diagonally scrolling graphics superb and the sound effects excellent." — Micro User



PLAY IT AGAIN SAM 5 for the BBC Micro and Acorn Electron

Superior Software has combined two recent chartbusters (one new to the Electron) with two all-time classic games. The result is another top quality four-game compilation that combines variety with great value for money.

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Unfortunately it is not technically possible to produce an Acorn Electron version of FORTRESS. The four games on the Acorn Electron version of PLAY IT AGAIN SAM 5 are: IMOGEN, ELIXIR, BUG-BLASTER and MOONRAIDER.

MOONRAIDER — A fast-moving and compulsive space spectacular from Micro Power. "A good value game, brimming with action and needing skill to test the most ardent arcade fanatics." — Electron User

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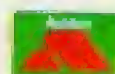
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